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Volume 55 Number 2

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IN THIS ISSUE

X-RAY COMPARISON OF UDDER INFUSIONS
DRUG MARKETING—PRESENT AND FUTURE
WHAT DO WE KNOW ABOUT DISTEMPER INCLUSION BODIES?
WHY CATS HAVE FURBALLS
EMERGENCY CARDIAC RESUSCITATION

Complete Index on Page 6

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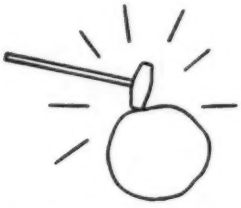

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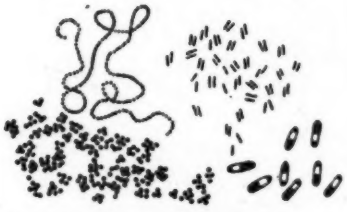

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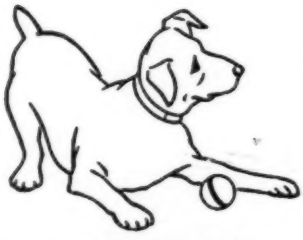

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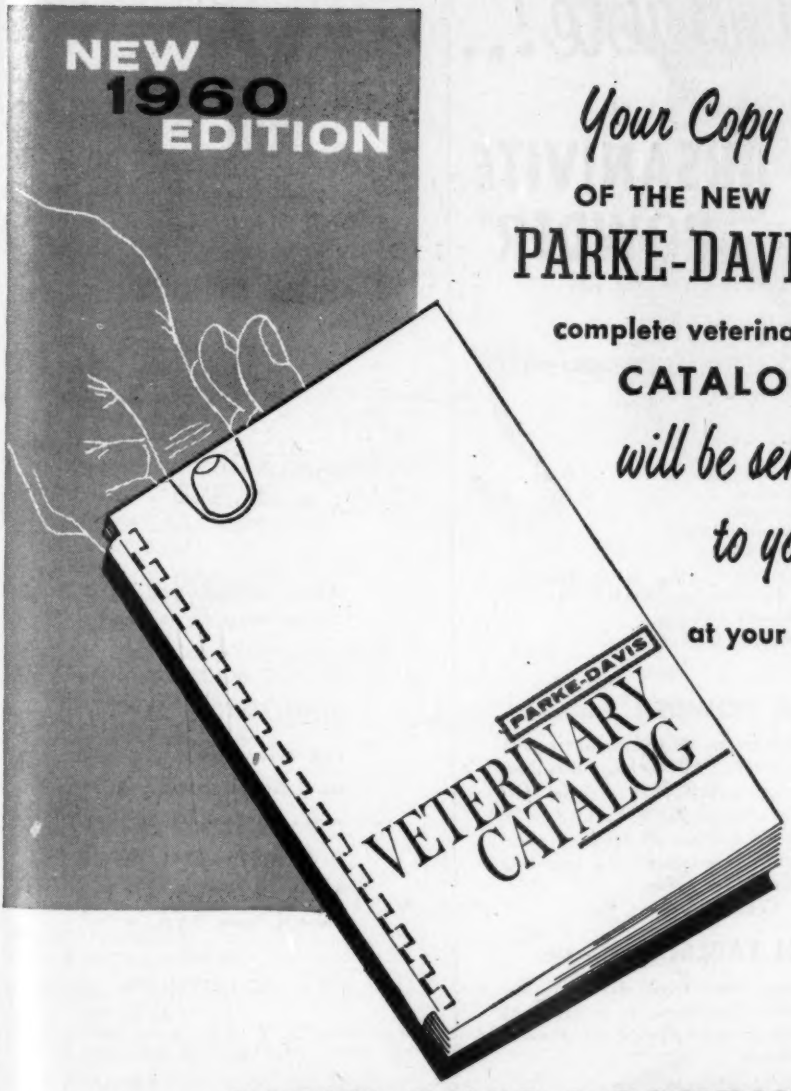

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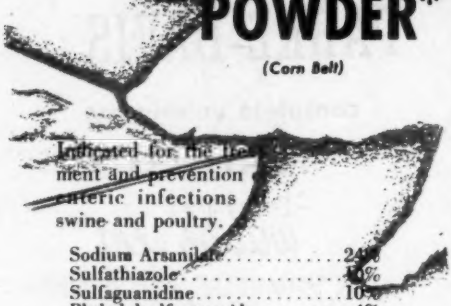

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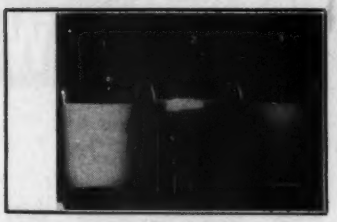
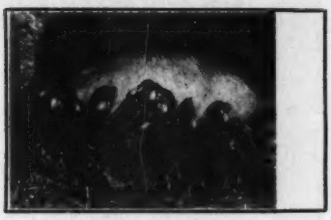


MASTITIS PREPARATIONS — Page 35



BABY PIG DISEASES — Page 43

General Practice

VEHICLES FOR INTRAMAMMARY MASTITIS PREPARATIONS 35
W. G. Huber, B.S., D.V.M., M.S., C. E. Lofgrin, M.S., B.S., William Reynolds, B.S., H. G. Luther, B.S., M.S.

DRUG TALK— PRESENT AND FUTURE OF DRUGS IN VETERINARY PRACTICE 41

DISEASES OF BABY PIGS 43
C. L. Vickers, D.V.M.

PROPHYLACTIC MEASURES IN BOVINE KETOSIS 71
Reynold C. Derrer, D.V.M.

EFFECTIVENESS OF HYGROMYCIN B AS AN ASCARICIDE FOR GROWING-FINISHING SWINE . . . 73
G. W. Kelley, D.V.M., L. S. Olsen, D.V.M., L. Sumption, D.V.M., and J. Adams, D.V.M.

Small Animal Practice

DISTEMPER INCLUSION BODIES 53
Conrad Donovan, D.V.M., and Richard L. Ott, D.V.M.

FELINE FURBALLS 58
W. R. McCuistion, D.V.M.

CARDIAC RESUSCITATION IN THE DOG 60
D. H. Will, D.V.M., M.S., G. A. Severin, D.V.M., R. A. Herin, D.V.M., M.S., K. W. Smith, D.V.M., M.S.

CAT PRACTICE 63
C. E. DeCamp, D.V.M.

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February 1960

Volume 55 Number 2

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NEWS COMMENT

Vesicular Exanthema Eradicated

A seven-year state-federal cooperative program has resulted in complete eradication of vesicular exanthema from the United States, Secretary of Agriculture Benson recently reported. Federal quarantine has been lifted from the last two townships in New Jersey, the Secretary said.

Since some countries still maintain an embargo on American pork products, removal of quarantine may signal removal of foreign embargoes, thus paving the way for greater export pork sales.

The eradication effort, now completed, involved passage of laws forbidding feeding of raw garbage to swine, quarantines, disposal of infected and exposed animals, and disinfection of contaminated facilities. Garbage cooking laws are now effective in 49 states.

Rabies Epidemic

A rabies epidemic on the California-Mexico border has been reported by Dr. James H. Steele, Communicable Disease Center, Department of Health, Education and Welfare, Atlanta. About 400 people are taking treatments on the Mexican side of the border, the report said.

Drug Probers

Drug price probe master, Senator Kefauver, and his subcommittee to investigate drug prices is one of the best staffed and financed of any Congressional committee, with 33 full-time employees and almost half a million dollars. After Congress opens, of course, the subcommittee can request, and almost certainly get, more money.

Antibiotics Against Tetanus

In certain instances, antibiotics are more effective against tetanus than tetanus antitoxins, according to Dr. Edward S. Stafford of Johns Hopkins University, Baltimore. If administered within one or two hours after injury, penicillin or other antibiotics can prevent growth of tetanus bacteria in some cases.

Student Trainee Veterinarians

The United States Department of Agriculture has announced an examination for the position of student trainee (veterinarian) at grade GS-7 with a salary of $4,980 per annum. This replaces the competitive examinations for GS-5 at a salary of $4,040, previously held. Graduate veterinarians now enter the federal service at grade GS-9 with a per annum salary of $6,135 (the former rate was GS-7, at $5,430).

This program for the summer employment of student trainees is one of the key factors in assuring that potential veterinarians become aware of opportunities in the USDA.

FDA Analysis

Recommendations of a management consulting firm, released after a study of the Food and Drug Administration, call for substantial increases in personnel and money. The report should carry considerable weight with the Budget Bureau and Congress.

Breakthrough in Shipping Fever

Isolation of a virus designated SF-4 from nasal mucosa of calves showing signs of shipping fever has provided a breakthrough in study of this disease. Experiments have been conducted by USDA investigators at the Beltsville, Maryland station. They have produced mild cases of shipping fever by spraying the virus into noses of healthy calves. It has been grown in tissue culture and an antiserum has been produced. SF-4 is similar to a virus that causes respiratory disease in children. It has not been determined yet whether SF-4 will cause disease in children or if the virus isolated from children will cause shipping fever.

Two other viruses have been isolated from cattle and calves that had shipping fever, and it is believed many others will be found before an effective shipping fever vaccine can be produced.

Gun Safety

Gun safety is now being offered as an extra-curricular course in more than half of the high schools in New Hampshire, according to a report in Today's Health, an A.M.A. publication. The idea for such instruction was sparked by the father of a 17 year old boy who was killed in a hunting accident. The idea spread until the state legislature passed a measure authorizing school districts to offer courses in firearm safety, hunting practices, and game laws.

At a time when anti-firearm legislation is making headway before the national Congress, those interested in protecting the rights of citizens to own and use firearms might do well to launch such courses of instruction in their own communities.

V

Here each month are published ideas, suggestions and comments picked up by VM reporters at veterinary meetings.

The Meeting Circuit

Fertility Evaluation

Fertility evaluation of bulls is an integral part of efficient beef production. Beef producers as well as dairymen are requesting evaluation of fertility of bulls they are using, selling or buying. Dr. John B. Herrick, Extension Veterinarian in Iowa, has been associated with the problem in the field for many years. Veterinarians have requested his help in the examination of many bulls. The advent of the electro-ejaculator has facilitated the demand for this evaluation.

In order for the profession to meet the demand, Doctor Herrick and the Obstetrics Department of the College of Veterinary Medicine conducted a Fertility Evaluation Post-Graduate Refresher Course for veterinarians on November 23 and 24. Upon completion of the course the veterinarians formed the Iowa Society for Animal Fertility Evaluation in order to have uniformity in fees, forms and technics. Dr. Richard Shirbroun of Coon Rapids, Iowa, is president of the group and Dr. Herrick is secretary.

TeSa Butterfat Test

On October 14, 1959 the Association of Official Agricultural Chemists recognized the accuracy of the TeSa Butterfat Test method and voted for its adoption and inclusion in the official methods manual for the determination of butterfat in all raw milk testing. This was a followup on the action of the American Dairy Science Association last June which approved the new test for all production testing and was closely followed by the D.H.I.A. approval last month. The chains which have bound the tester to the acid bottle and centrifuge for over a half century have been broken. The TeSa method uses no acid, no centrifuge, is accurate and simple to perform. The TeSa method of butterfat testing is now available through the local dealers of Technical Industries of Fort Lauderdale, Florida, also producers of the well known Milk-o-Meter, Feed-o-Meter and other TeSa products.

Training Veterinarians

Clinical diagnosis must remain a most important part of the veterinarian's training. Ability to perform certain laboratory tests and recognition of the need to utilize facilities of a complete central diagnostic laboratory will be increasingly important. Veterinarians of the future must also have a much better understanding of nutrition of healthy and sick animals. In dealing with sick animals consideration must be given to the effect of disease on vital tissues and organs. More knowledge of therapeutic nutrition or prescription rations will be needed.

Other areas in which a veterinarian will need more training should include livestock management, location and construction of buildings and equipment for housing and

handling livestock and poultry, the economics of livestock and poultry production and marketing, and an understanding of contracts as they apply to the veterinarian's services. — *A. H. Groth, D.V.M., Dean, School of Veterinary Medicine, University of Missouri.*

Technic for Pony Colt Castration in Practice

The increasing number of pony brood mares has brought about a greater number of pony colts to be castrated each year. Very frequently I find that the testicles do not descend in these males until later than in other colts. This plus the desire to have these individuals obtain maximum size and masculinity has led me to recommend almost routinely that they not be castrated at less than 18 to 24 months of age.

Castration technics are quite variable and each has certain advantages and disadvantages. I feel, however, that the following procedure has more advantages.

The patient should first be examined for any evidence of abnormality of the testicles or scrotal area. This will eliminate the possibility of finding a cryptorchid, low flanker or monorchid after surgery has already begun.

A casting harness consisting of double cotton rope side lines and leather hopples should be fitted to the patient. This is more advantageous than any commercial leather casting harness primarily because of its wide range of size adaptability, and its low cost and ease of transporting and handling. Furthermore, both front and rear legs on the same side can be secured using the same rope. A detailed explanation and diagram of this and many other helpful restraint methods can be found in Leahy and Barrow's excellent book entitled *Restraint of Animals.*

To prevent excitement, fighting, and possible injuries, intravenous anesthetic should always be given prior to casting. Most ponies will require 50 to 100 cc. of Equithesin (Jen-Sal) or Chloropent (Fort Dodge) administered rapidly. Rapid administration allows one to be ready to cast the animals by the time effects of the anesthetic are evident. I definitely prefer intravenous sedation or anesthesia to tranquilizers because the results are more constant and satisfactory.

For the right handed surgeon the patient should be cast on his right side, securely tied and finally brought to rest either on his left side or preferably on his back if adequate help is available to hold him in this position. Such a position permits better surgery than can be accomplished using the standing method.

The operator should place one foot on the colt's tail and never remove it until all surgery has been completed and the patient is ready to get up. This prevents contamination of the surgical field should the patient jump or switch his tail. Draping the hocks and the restraining ropes is advocated.

An incision paralleling the median raphé and made by stroking over each testicle which should be secured by the left hand, allows for greater ease in freeing the testicle and less trauma and subsequent swelling than when the end of the scrotum is removed and the testicles freed by digital blunt dissection. If removal of the median septum is desired, it can be done as a final step. Where it is suspected that after care will be poor and exercise limited, its removal is advocated.—*Paul E. Hoffman, D.V.M., Georgia Veterinarian, January-February 1959.*

Intestinal Infections

Apart from intestinal infections, many baby pigs appear to be subject to digestive upset. Can any reason be advanced? These questions prompt a searching analysis of digestive upsets.

It is possible that a deficiency of enzymes, pepsin and pancreatic amylase, which occurs in newborn piglets up to the age of four to five weeks, may be a contributory cause of digestive upset. The animals are able to digest most animal protein derivatives but cannot cope completely with protein of vegetable origin, *i.e.* groundnut meal and soya flour. Incomplete assimilation of

nutrients from the bowel may also be a concomitant factor in piglet anaemia — a frequent cause of unthriftiness.—*The Pennant, October 1958.*

The problems of breeding and foaling are many—to the experienced and to the novice. Here are questions and answers from a panel discussion which was held by the Thoroughbred Club of America, Inc., at the Phoenix Hotel, Lexington, Kentucky, on February 14, 1959. The full series of questions has been reported in the ROCKY MOUNTAIN HORSEMAN.

Condition for Mares

We now have our in-foal mares in winter quarters. What condition as to flesh do you like to keep these mares in? Thin? Medium flesh? Fat? Why?

I think it stands to reason that we can follow the practices of pregnant women these days. Doctors don't like them overly fat. We can't actually see inside a mare, and if she has a thick layer of flesh on her, she may have trouble foaling and perhaps have a stunted foal.—*Howard Endicott*

Maiden Mares

What about maiden mares, do you feed them any differently?

Not particularly. A lot of maiden mares we have coming from the track will have a tendency to lose flesh for a while. I would prefer to have a maiden mare, if she had raced, to have a little acclimation period prior to breeding, or else breed her the minute she comes off the race track. A good many mares that have been in constant training and then come to the farm will look bad for a while until they adjust themselves to being turned out in pasture.—*Ralph Kercheval*

Veterinary Calendar

Feb. 1-5. **Epidemiology for Veterinarians,** a short course. Communicable Disease Center, Training Branch, United States Department of Health, Education and Welfare, Atlanta, Georgia. James Lieberman, D.V.M., assistant chief, Public Health Service, DHEW, 50 Seventh Street, N.E., Atlanta 23, Georgia.

Feb. 14. **American Animal Hospital Association, Region 4.** Colorado State University, Fort Collins, Colorado.

Feb. 15-17. **Colorado State University,** 21st annual conference for veterinarians. College of Veterinary Medicine, Fort Collins, Colorado. (A short course in bull evaluation will be held Saturday, February 13, and Sunday morning, February 14.) Dr. O. R. Adams, Department of Veterinary Clinics and Surgery, Fort Collins, Colorado, program chairman.

Feb. 15-17. **Illinois State Veterinary Medical Association,** annual convention. Hotel Abraham Lincoln, Springfield, Illinois. Dr. C. G. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Illinois, executive secretary.

Feb. 21-23. **The Missouri Veterinary Medical Association,** 68th annual meeting. Hotel President, Kansas City, Missouri. Dr. Paul L. Spencer, P.O. Box 283, Jefferson City, Missouri, secretary.

Feb. 24-25. **American Animal Hospital Association, Region 1.** Shoreham Hotel, Washington, D. C.

Feb. 28-29. **West Virginia Medical Association,** winter meeting. Greenbriar Hotel, White Sulphur Springs, West Virginia. Harry J. Fallon, 200 Fifth Street West, Huntington, West Virginia, secretary.

Mar. 4. **Indiana Veterinary Medical Association,** third Symposium on Therapeutic Nutrition. Co-sponsored with Vita Vet Laboratories State Board of Health Building, Indianapolis, Indiana. E. E. Slatter, D.V.M., Box 108, Marion, Indiana, chairman.

Mar. 29-30. **American Animal Hospital Association, Region 3.** Commodore Perry Hotel, Toledo, Ohio.

Apr. 30-May 1. **Third Annual Florida Conference for Veterinarians,** symposium on Diseases of Young Animals. University of Florida, Gainesville, Florida. W. R. Pritchard, head, Department of Veterinary Science, University of Florida, Gainesville, correspondent.

May 19-21. **Kansas State University,** 22nd annual Conference for Kansas Veterinarians. School of Veterinary Medicine, Kansas State University, Manhattan, Kansas. M. W. Osburn, D.V.M., extension veterinarian.

Jun. 27-29. **California Veterinary Medical Association,** 72nd annual convention. Jack Tar Hotel, San Francisco. Ken Humphreys, 3004 16th Street, Rooms 301-2, San Francisco 3, California, executive secretary.

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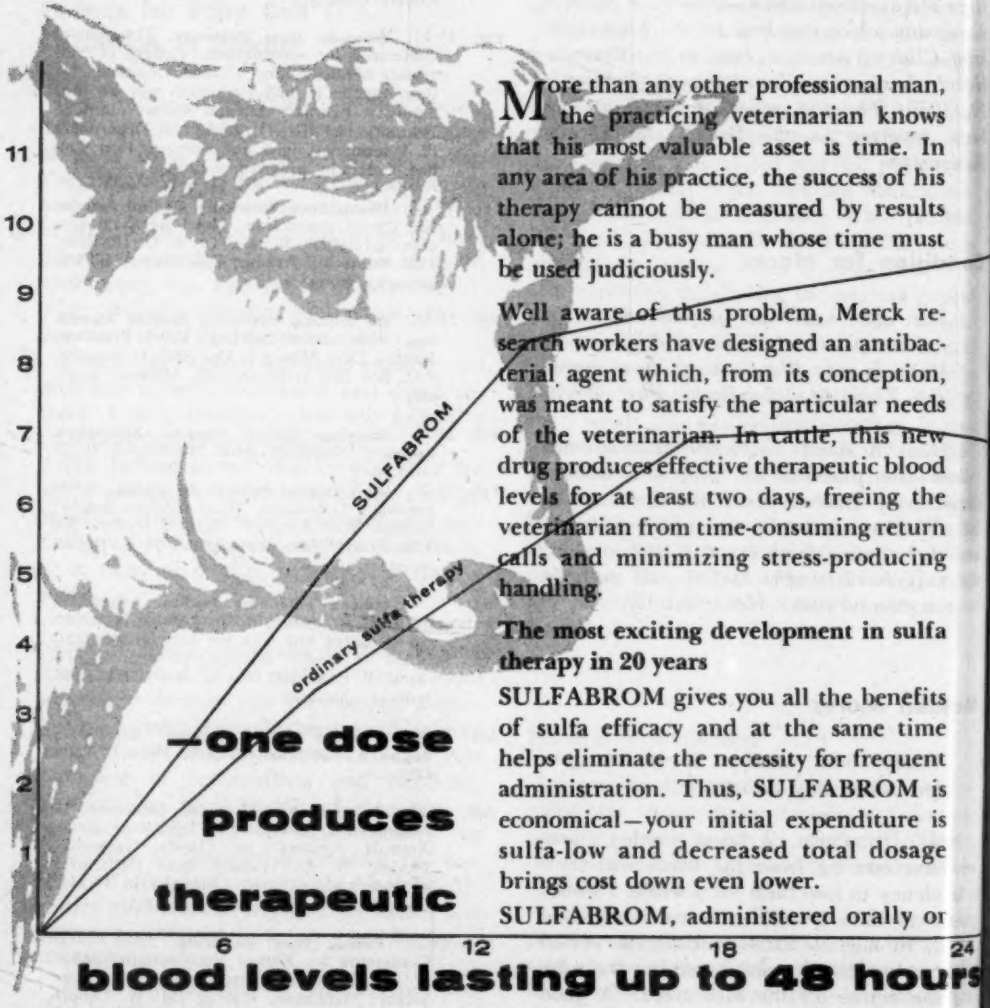

More than any other professional man, the practicing veterinarian knows that his most valuable asset is time. In any area of his practice, the success of his therapy cannot be measured by results alone; he is a busy man whose time must be used judiciously.

Well aware of this problem, Merck research workers have designed an antibacterial agent which, from its conception, was meant to satisfy the particular needs of the veterinarian. In cattle, this new drug produces effective therapeutic blood levels for at least two days, freeing the veterinarian from time-consuming return calls and minimizing stress-producing handling.

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VEHICLES FOR INTRAMAMMARY MASTITIS PREPARATIONS

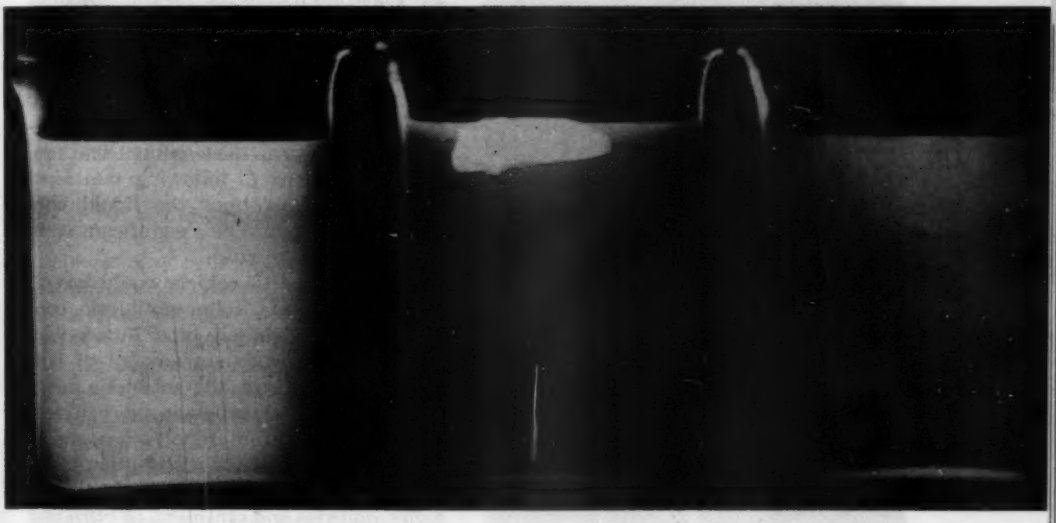

Fig. 1. An aqueous solution vehicle in which the aqueous radiopaque material Diodrast had been incorporated added to 400 ml. of raw milk (left beaker); an ointment vehicle containing Lipidol added to 400 ml. of raw milk (center beaker); control 400 ml. of raw milk (right beaker).

W. G. HUEBER, B.S., D.V.M., M.S.
C. E. LOFGRIN, M.S., B.S.
WILLIAM REYNOLDS, B.S.
H. G. LUTHER, B.S., M.S., Ch.E., D.S.

Pfizer Research Laboratories
Terre Haute, Indiana

Many workers have reported disadvantages of ointment or oil vehicles of therapeutic mastitis preparations. Vigue[1] reported that such vehicles which do not dissolve in water will not dissolve in milk, which is an aqueous secretion that is 88% water. Full benefits of antibiotics or other chemotherapeutic agents for intramammary use cannot be realized if the vehicle fails to dissolve and completely release the antibacterial substances.

Mills[2] had the opinion that the more mastitis he treated the more convinced he became that oily vehicles are not desirable. Preparations containing oily masses cannot be massaged up into the swollen gland, causing oil to be milked out for days afterward, and are far from ideal.

Schipper[3] compared the two general types of vehicles most widely used, ointments and aqueous solutions, on the basis of intramammary penetration. He reported a more even distribution of antibiotics throughout the infused quarter following the use of aqueous solutions.

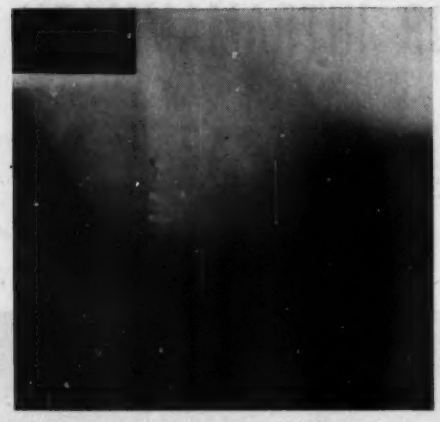

Fig. 2. Radiograph of a normal bovine quarter distended with milk (left hind quarter).

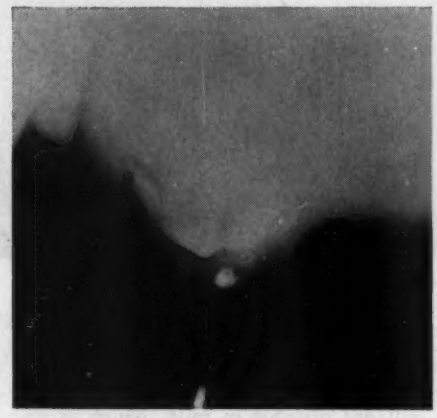

Fig. 3. Left hind quarter immediately after infusion of ointment vehicle.

Fig. 4. Left hind quarter immediately after infusion of an aqueous solution vehicle.

In some instances massive quantities of ointment vehicles were found adhering to the teat wall 24 hours after administration. Massaging the infused quarter immediately after administration of ointment preparations gave no indication of aiding penetration. In one instance ointment was found in the outpocket of the lower mammary gland six weeks after the infusion.

Feldman in a personal communication to Vigue[1] reported untoward reactions following administration of antibiotics suspended in oil, including the development of indurated nodules in the quarter that received the antibiotic-oil medicaments. It was his opinion that in the granulomatous nodules which had developed in quarters following treatment with such preparations the lipoid constituent appeared to be a significant component of this mixture.

An ideal mastitis vehicle would be one which affords maximum antibiotic concentration immediately after infusion by obtaining the maximum amount of surface contact between the antibiotic agent and the mastitis producing organisms. This communication reports the radiographic findings of the distribution characteristics of two types of mastitis vehicles, aqueous and ointment, *in vitro* and *in vivo* after administration to a lactating bovine udder.

This report treats the distribution characteristics of the type vehicles employed in mastitis treatment. A subsequent communication is in preparation which quantitatively describes the amount of medication levels available in the milk for the treatment of the infection in which the agent is incorporated in these types of vehicles.

Materials and Methods

Two types of radiopaque material; Iodochlorol, a chlorinated and iodinated peanut oil (Iodochlorol—G. D. Searle & Company) and Iodopyracet, a 35% water-soluble iodine containing compound combined with diethanolamine (Diodrast—Winthrop) were used.

The Iodochlorol was incorporated in

an ointment vehicle (melting range 38 C. and 60 C., specific gravity 0.815 to 0.880 at 60 C.) containing a broad spectrum antibiotic, and the Iodopyracet was incorporated into a vehicle which was an aqueous solution of a broad spectrum antibiotic. The investigation was conducted *in vitro* and *in vivo*. The *in vitro* phase consisted of three treatments: (1) the ointment vehicle containing iodochlorol added to 400 ml. of raw milk; (2) the aqueous solution vehicle in which the aqueous radiopaque material iodopyracet had been incorporated added to 400 ml. of raw milk; and (3) a control, 400 ml. of raw milk. Radiographic examinations of the three treatments were conducted. (Figure 1.)

Radiographic Examinations

The *in vivo* phase consisted of two treatments: (1) intramammary infusion of the ointment vehicle containing iodochlorol to a lactating bovine udder; and (2) intramammary infusion of an aqueous solution vehicle containing the aqueous radiopaque material iodopyracet to a lactating udder.

Radiographic examinations were conducted before infusion, immediately after infusion, one hour and four hours after infusion. A portable *x*-ray machine with a maximum output of 15 milliamperes and 80 KVP was used (Picker X-ray Corporation). High-speed cassettes (10 x 12 in.) were used with Kodak Blue Brand *x*-ray film. A 30 inch focal tube distance was used in all exposures. The time, milliamperage and KVP were altered within the following ranges in order to obtain maximum contrast: the KVP ranged between 70 and 80. The milliamperage in practically all instances was 10. The time ranged from 1/4 to 3/8 of a second.

X-Ray Procedure

The *x*-ray tube was placed at a right angle to the long axis of the cow, and the treated quarter was the closest quarter to the cassette.

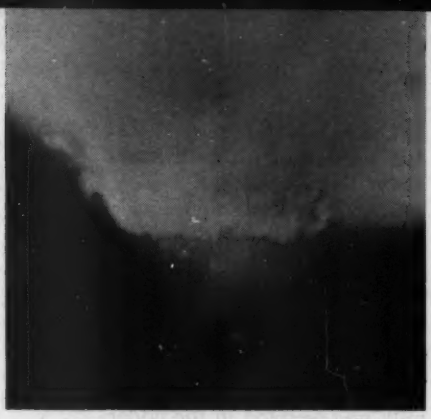

Fig. 5. Left hind quarter one hour after infusion of ointment vehicle.

Fig. 6. Left hind quarter one hour after infusion of an aqueous solution vehicle.

Fig. 7. Left hind quarter four hours after infusion of ointment vehicle.

The *in vitro* test showed that the aqueous solution vehicle disperses immediately throughout the beaker of milk, whereas the ointment vehicle floated on top of the milk. No change in dispersion was observed after the ointment vehicle was stirred and left standing for one hour at room temperature. Observations made in the *in vitro* phase were consistent with the *in vivo* phase because the ointment vehicle floated on top of the milk as the milk was secreted in the udder.

All treatments were administered after the cow had been milked out. Radiographic examination showed that the ointment vehicle did not disperse as rapidly as the aqueous solution vehicle. The area of surface contact between vehicle and tissue was much greater with the aqueous solution vehicle than with the ointment vehicle. As the milk was formed, the aqueous solution vehicle was in contact with all of the mammary tissue wherever there was secreted milk, whereas the ointment vehicle tended to float together in a few large clumps. Some of the ointment vehicle remained in the teat canal.

Results

Figure 2, left hind quarter, is an *x*-ray of a normal quarter distended with milk.

Figure 3 shows the left hind quarter immediately after infusion of the ointment vehicle in which the radiopaque oil had been incorporated. (Figures 5 and 7 are the same quarter and with the same treatment at one and four hours after infusion.)

Figure 4 shows the left hind quarter immediately after infusion of an aqueous solution vehicle in which an aqueous radiopaque material, iodopyracet, had been incorporated. (Figures 6 and 8 are the same quarter and the same treatment at one and four hours after infusion.)

Summary

The results obtained confirm disadvantages of an ointment vehicle reported by other workers cited in the introduction of this communication. Advantages of an aqueous solution vehicle have been demonstrated. It may be concluded that the aqueous solution intramammary mastitis treatment vehicle containing iodopyracet obtained a much greater area of mammary tissue and secreted milk surface contact than the ointment intramammary mastitis treatment vehicle containing iodochlorol. The ointment mastitis treatment vehicle tended to float together in a few large clumps and did not show the rapid diffusion necessary to obtain the maximum mammary tissue and secreted milk surface contact. Ideal principles of intramammary treatment with the ointment vehicle were not obtained whereas the aqueous solution vehicle obtained maximum surface contact throughout the mammary tissue and secreted milk.

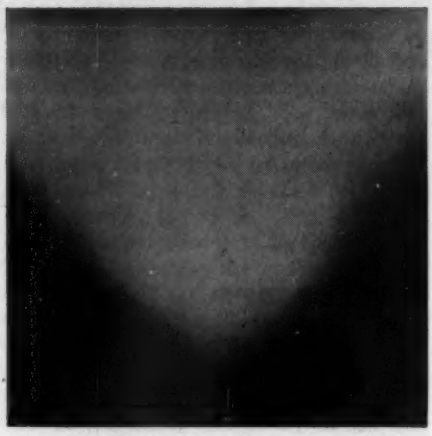

Fig. 8. Left hind quarter four hours after infusion of an aqueous solution vehicle.

Acknowledgment

The authors wish to thank Dr. T. N. Phillips for his guidance and counsel in the radiographic phase reported in this communication.

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DRUG TALK

WHAT, pray tell, is an "ethical" drug? Are all other drugs perforce unethical? Or is there a twilight zone, extant only to shelter those drugs that are neither morally delinquent nor delightfully virtuous? These are interesting questions recently posed by the editor of *GP*, a publication for the practicing physician.

What is an "ethical drug" to the goose is something else to the gander. We hear it defined as (1) a drug advertised only to members of the medical profession and (2) a drug that requires a prescription. These are not mutually exclusive. A product can be both, either or neither. It's all very confusing.

Certainly pharmaceutical advertising may be ethical (under the first definition above) but that's as pointless as saying that a product's good because the ad is pretty. Let's not confuse advertising and the product advertised.

There must be a better, more meaningful term. Why not "professional" drugs in contrast to "consumer" drugs?

Ethical doctors, yes; ethical drugs, no. It's almost always easier to say what we really mean.

Procedures of drug promotion and distribution have long been a subject of vital concern to the practicing veterinarian. Recent hearings in Washington have focused the spotlight on the whole drug industry, forcing advocates of a free enterprise system to defend their position before the advocates of socialized controls. Current publicity and stricter controls by the Food and Drug Administration could well bring about some modifications in established drug marketing patterns. As a result, the whole subject warrants renewed interest on the part of the veterinary profession.

Members of the Florida State Veterinary Association explored this topic at their annual meeting in Tampa late last year. Moderated by Dr. Jack Knowles of Miami, a panel consisting of R. J. Brown, Pfizer Laboratories; Dr. Leonard Skamser, American Cyanamid; Dr. Vladimir Dvorkovitz, Jen-Sal Laboratories; Dr. R. W. Ormsbee, Stockton, California practitioner; and Dr. J. C. Siegrist, Schering

Corporation, reviewed personal beliefs on the present and future marketing trends of veterinary drugs.

To introduce the subject each commercial panelist was asked to describe present sales policy and the reasons for this particular position.

PRESEN

Pfizer reports . . .

Robert J. Brown, speaking for Pfizer Laboratories, noted that the sales division of the firm was responsible for marketing the following groups of products: (1) Pharmaceutical products for the medical profession; (2) veterinary products for the exclusive use of veterinarians; (3) proprietary animal health products for the veterinarian and retail drug stores.

Brown noted that these three product groups are sold to the veterinarian by way of veterinary wholesalers. The only group sold over the counter is the proprietary animal health products. These products are sold to the retail drug store either directly or by way of the drug wholesaler.

This sales policy has been in effect since January 1, 1954. "We have this policy because it is economical, sound, and open and above board," Brown said. "We plan to continue this sales policy as of this moment."

Robert J. Brown, who presented the Pfizer viewpoint on matters related to present and future of drugs in the veterinary profession, is veterinary marketing manager for Charles Pfizer, Brooklyn, New York.

Charles Pfizer is best known for its development and marketing of the broad spectrum antibiotic, Terramycin, and its more recent synthetic tetracyclines.

Jen-Sal reports . . .

Vladimir Dvorkovitz, Ph.D., told the group that Jen-Sal Laboratories has sold only to veterinarians since its establishment in 1914. He pointed out that he did not feel that this entitled the firm to any special privileges. In his opinion, a fundamental change has revolutionized the industry and the profession. It did not occur overnight, but step-by-step moves have been made that have not always been apparent. The damage has now become sufficiently obvious to cause alarm.

Dvorkovitz contends that the veterinary companies have been basically backward in new developments. Major advances in veterinary medicine—apart from biologicals, where the veterinary companies are ahead—have been introduced to the veterinarian by the human houses.

In the face of a steadily increasing market for animal health products, there has developed a diminishing market for veterinary services. To fight and survive successfully, the veterinarian's weapon must be a combination of the quality of his services and quality products that cannot be duplicated at any price.

He pointed out that Jen-Sal Laboratories increased its research fourfold three years ago, and has continued to increase it since then. A product will no

concluded on page 42

and FUTURE of DRUGS in VETERINARY PRACTICE

Schering reports . . .

The present sales policy of the Schering Corporation is "sales to graduate veterinarians only," according to Dr. J. C. Siegrist, spokesman for the firm. Doctor Siegrist went on to note that this has been the established policy at Schering ever since a decision was made to enter the veterinary field. It also reflects the thinking of a firm which has long maintained a similar policy in selling its human products.

In as far as possible, it is planned that the company will continue to market veterinary specialties through professional channels in the same manner that human specialties are marketed.

This does not preclude the acquisition of companies by the parent organization for investment and diversification purposes, Doctor Siegrist stated. It is difficult to ascertain exactly what percentage of gross sales of the corporation are made to veterinarians, but it was estimated to be roughly in the neighborhood of 4% of Schering's domestic professional sales.

In further stating company policy, Doctor Siegrist said: "Enormous capital expenditures and operating expenses are required in maintaining research facilities. The 1959 budget for the research division at Schering is some eight million dollars. Obviously, we must direct our efforts toward introducing only such products as will substantially benefit veterinary and human medicine.

American Cyanamid reports..

Dr. Leonard Skamser reported that American Cyanamid handles all products related to food production. The firm maintains two sales forces. One group of salesmen calls on the feed manufacturer, and the other solicits business from veterinarians. This policy was established in 1957. The marketing channel used depends on the nature of the product being sold. Doctor Skamser estimated that 60% of the firm's sales came from feed manufacturers, 20% from veterinarians. At least 20% of sales are accounted for in the distribution of animal health products.

Doctor Skamser voiced the opinion that so-called ethical sales volume could never support the research cost of developing truly great new products. He noted that it is the role of the A.V.M.A. to afford protection for the veterinarian by influencing state legislatures to adopt uniformly effective practice acts.

He pointed out that feed additives were another problem to be considered separately. All drug companies will sell through the legally authorized channels. They are not obliged ethically to do otherwise.

Leonard Skamser, Ph.D., who is manager, Technical Services, American Cyanamid Company, New York, has had a long career in drug development and sales policy. His insight into professional problems comes from many years on the commercial firing line.

A practitioner reports . . .

Dr. R. W. Ormsbee, the only practitioner representative on the panel, reported that according to his records, drug sales are unprofitable for the veterinarian. The veterinarian is maneuvered into a difficult corner if he relies on drug markup and minimum professional fees. Better merchandising is not ethical and does not provide a stable future. In areas where drug markup constitutes the major source of income, the impact on future large animal practice is great. It could deprive small towns of veterinary service.

He pointed out that a veterinarian can drive clients away from professional service by harping too much about the drug source. As demonstrated by his practice, Doctor Ormsbee is convinced that the solid future of the profession lies in professional service and counsel.

Doctor Ormsbee sees several possible developments that may characterize the profession if veterinarians remain active in drug distribution: (1) Abandonment of large animal practice; (2) improvement of merchandising methods and alteration of ethics; (3) general regard of the veterinarian as a wholesaler; (4) all large animal practice being socialized; (5) and prescription only handling of drugs by veterinarians.

Jen-Sal reports . . . concluded

longer be introduced unless it is either the first of its kind or better than anything else, and/or patented to give the veterinarian the best protection possible. This represents this firm's support of the veterinarian's battle against disease and the dangers of promiscuous medication. Jen-Sal will spend large sums of money in advertising and all forms of promotion to bring new business to the veterinarian. This program is designed to tell clients—the farmers, pet owners and sportsmen—about the tools at the command of practitioners. This means products for the veterinarian years ahead of those available elsewhere. Clients will be told about veterinary service, how it benefits them in every way, how a practitioner can best advise them to raise animals to healthy maturity in the best, and thus, inevitably, the most economical way.

The law is not in support of drugs on prescription, and the possibility of change seems doubtful as long as farm block policies exert strong legislative influence. Can the profession grow on the basis of expanding professional services alone? Many are convinced that it can. Others are hesitant.—*The Editors*

Vital Statistics

Compared to 20 years ago, more women are marrying earlier and having larger families, according to statistics released by the Metropolitan Life Insurance Company. In the 20's, marriages averaged about 1,200,000 a year, and during the worst of the depression years, 1932-33, only 982,000 couples were married per annum.

In 1958, the number of married women totaled 41,500,000, which is 11,333,000 more than in 1940.

B-virus Encephalomyelitis

B-virus encephalomyelitis is a disease of monkeys that can be fatal to laboratory workers, according to Dr. James E. Prier of the University of Pennsylvania. Although only eight cases of the disease in human beings have been reported to date, the incidence seems to be increasing as more monkeys are used for research. No vaccine or immunizing products are known.

DISEASES OF BABY PIGS

Part II

ARTHRITIS

GLASSER'S DISEASE

NUTRITIONAL SCOURS

TRANSMISSIBLE GASTROENTERITIS

INTESTINAL THREADWORM

by C. L. VICKERS, D.V.M.
Columbia, South Carolina

ARTHRITIC DISEASES

UNDER THIS BROAD OUTLINE heading, disease conditions are frequently characterized as navel ill, joint infection, polyarthritis, pyosepticemia, erysipelas, and streptococcic arthritis.

Cause. A number of agents are capable of causing arthritis or joint infections in baby pigs. These include *Erysipelothrix rhusiopathiae, Escherichia coli, Streptococcus, Staphylococcus, Corynebacterium pyogenes, Salmonella, Pasteurella, Brucella* and the virus of hog cholera. Glasser's disease, the exact cause of which is unknown, is also capable of producing an arthritis in baby pigs.

Predisposing Cause. Many of the causative organisms gain entrance

through the navel cord, so poor sanitation can be considered as a predisposing cause.

Age Incidence. Arthritis occurs in swine of all ages, but this discussion is limited to those arthritic conditions found in baby pigs.

Signs of the Disease. The signs vary somewhat depending on the cause. In true navel ill, the age incidence is usually one to four weeks. Pigs are unthrifty, have a rough coat and often scour. Swellings appear in one or more joints, and the pigs develop a stiff gait. The condition may be so painful that affected pigs walk on the front feet with their noses to the ground so as to keep weight off rear limbs. The number of pigs affected may vary from one pig in a litter to several pigs in a number of litters. Occasionally a pig may appear in good condition and still have a swollen joint.

If the arthritis is caused by a streptococcic infection, it often follows a septicemic form of the disease in which the affected pigs run a high temperature, lose their appetite, and develop diarrhea. The skin also becomes rough, weakness is noted in the rear quarters when walking, and tremors or violent shaking may be evident.

In arthritis caused by erysipelas, joint swelling may or may not be pronounced. There is often a shifting of weight from one limb to another, so that the pigs are said to be "toe dancing." The ears may curl up, and there is a marked reddening of the underline of the abdomen, other areas of the skin and even the snout. Sudden deaths and diarrhea are also noted in outbreaks of erysipelas in baby pigs.

In joint infection caused by Salmonella or Pasteurella, there are usually signs of a septicemic infection.

The mortality can be high, especially if a septicemia is involved, but in most of the infections, where the joint involvement is the outstanding sign of the infection, the mortality is low, and the most serious losses are weight loss, stunting and crippling.

In true navel ill, there is evidence of a generalized pyemia, and peritonitis. Abscess formation in the navel region is common. A bleb or ball of pus is sometimes found on the inner wall of the abdominal cavity in the region of the navel. Pyemia and peritonitis also occur in the septicemic form of staphylococcus and streptococcus infections. Serous fluid or pus is found in the joints or around the joints and along the tendon sheaths. The pus is often caseated. In erysipelas, Salmonella, and Pasteurella infections, the joints contain only serous fluid or fibrin.

Diagnosis. Laboratory confirmation by isolation of the causative organism should be sought, but a tentative diagnosis can often be made by smearing a small amount of pus from the joint on a clean glass slide and staining with methylene blue or the stain of choice, and looking for bacteria. Both organisms can quite easily be identified by their characteristic morphology. Other bacteria would be more difficult to identify. Erysipelas is seldom found in pigs under three weeks of age, and this is a helpful feature in differentiating this disease from streptococcic infections.

Treatment. Treatment depends on the causative organism. In true navel ill, severely affected pigs should be culled since the prognosis is unfavorable. Other pigs should be treated with antibiotics and mixed bacterins containing the causative organism. If this type of trouble persists on the farm, it may be necessary to vaccinate gilts and sows two or three weeks after breeding with the bacterin of choice. This bacterin should be repeated according to the manufacturer's recommendation in seven to ten days.

Prevention. Dipping the navel cords of newborn pigs in iodine is a good preventive measure. Rigid sanitation and in some premises vaccination with a mixed bacterin may also be recommended.

Glasser's Disease

Glasser's disease is frequently known as serosal disease, infectious polyarthritis, Reilly-Selye syndrome, virus pericarditis,

sero-fibrinous pericarditis, and Pasteurellosis.

Cause. The exact cause of Glasser's disease has not been established. It has been described as a coccoid to coccobacillary, gram negative organism. It has also been variously attributed to such agents as *Haemophilus suis,* a nonbacterial cause, a pleuropneumonia-like organism and a viral agent. Further it is not known that all the diseases listed under this heading are the same. However, the diseases described according to clinical signs observed have been very similar and they are grouped under one heading for convenience of discussion.

A similar condition called Mycoplasmosis apparently caused by a Mycoplasma (PPLO) organism is being observed in the Midwest.

Age Incidence. This disease is most common at four to 12 weeks of age.

Predisposing Causes. Overfeeding, exposure to cold during transportation, change in environment, weaning, any stress, and possibly the introduction of carrier animals into a herd are predisposing causes.

Signs of Disease. This is an infection of young pigs characterized by sero-fibrinous inflammation of serous membranes of all body cavities and joints. Death may occur in three to seven days. It closely resembles erysipelas and has been called pseudo-erysipelas. There is a loss of appetite, a rise in temperature up to 104 to 108 F., coughing, and arthritis (lameness) in one or more legs. The pigs may appear apprehensive or nervous when approached, probably due to pain on movement, or handling. There is often a pimply eruption of the skin. The skin of the abdomen and inner thighs turns reddish or red blue. Some show nervous symptoms and convulsions followed by a spreading paralysis. Under the name of the Reilly-Selye syndrome which according to the authors includes Glasser's disease, the following signs are mentioned: a fluid stool progressing to hemorrhagic posterior paralysis; edema of the eyelids, head, neck, shoulders and abdomen; also edema of the central nervous system which causes incoordination and encephalitis. This particular set of symptoms is very similar to "edema disease" and does not seem to fit in with other descriptions of Glasser's disease.

The mortality rate may be high in Glasser's disease.

The pleural, pericardial and peritoneal cavities may all three be involved upon necropsy examination. There are varying degrees of pericarditis, pleuritis, and peritonitis marked by threads or yellowish masses of fibrin and fibrinous adhesions. Sometimes a grayish to yellowish watery liquid may be found in the body cavities. The joints contain a turbid fluid with fibrin deposits.

Diagnosis. This disease is said to be the only swine disease characterized by both polyarthritis and extensive sero-fibrinous inflammation of the pleura, pericardium, peritoneum and intestinal serosa. The disease must be differentiated from erysipelas with pericarditis and arthritis. Also pasteurellosis, streptococcicosis, and other pyogenic infections may give a similar picture on post mortem.

Treatment. Obviously ill pigs should be given sulfa drugs via injection, while the herd may be treated with a sulfa drug in the feed or drinking water. The corticosteroids in 25 mg. daily doses have been reported beneficial.

Prevention. Stress should be prevented whenever possible.

Enteric Diseases

Diarrhea or scours is said to be the most common cause of death in baby pigs. It is difficult to classify all types of diarrhea as to specific cause. Broadly, they may be classified as nutritional and infectious. The nutritional may be broken down into hyponutritional and hypernutritional factors.

Hypernutritional factors fall under the following outline.

Cause. Overfeeding the sow during the first eight to ten days of lactation, overeating by sows or pigs on lush, succulent pasture, overfeeding of milk products are factors. Naturally heavy milkers with

small litters are involved.

Predisposing Causes. Chilling and/or wet (moist) bedding constitute predisposing causes.

Age Incidence. The condition can be found at one day to four weeks of age, but is more common at three days to one week.

Signs of the Disease. On a herd basis, it may affect a small or large number of litters. Not all pigs in a litter are always affected. Temperature is usually normal. There is some, but not complete, loss of appetite. They do not lose condition very rapidly. They develop a diarrhea which may be watery or of a "string-like" consistency, on succulent pasture the diarrhea may be intermittent. Feces vary in color from whitish to yellowish-green. The scours often causes a secondary anemia manifest clinically by the baby pigs licking at the bedding or walls.

The rate of mortality is usually low.

At necropsy lesions are not marked. A mild inflammation of the gastro-intestinal tract may be present. Some degree of anemia may be present, in which case foreign material is often present in the stomach.

Diagnosis. A history of overfeeding or overeating, lack of significant findings at necropsy, normal temperature, low mortality, and response to treatment should assist in making a diagnosis.

Treatment. If the diarrhea is due to overfeeding of the sow, then reduce her ration in total quantity or reduce the protein. One ration that has been suggested is one-half oats, one-half shorts with 5% mixed proteins, plus the addition of a cup of black strap molasses to the feed. Another ration that has been used is light mixed bran and red dog. In addition to altering the sow's ration the pigs may be medicated through the sow's milk. The sow may be given an initial dose of 120 grains of methenamine via balling gun or mixed in the ration. Follow this initial treatment with 60 grains twice daily to effect. If preferred, 2 drams of formaline in a pint of milk may be given the sow. Other treatments include the addition of sodium bicarbonate to 5 lb. of slop feed or 1 gram of oxytetracycline via intramuscular injection to the sow. Affected pigs may be treated individually by injection intraperitoneally of 5% glucose. Also, any of the various pig scour compounds may be beneficial.

Prevention. Eliminate wet bedding and avoid chilling. Increase the sows' ration gradually after farrowing until they are on full feed ten days later. A completely balanced bulky ration may be fed during the first ten days following farrowing. If the sows and pigs are on succulent pasture, make water readily available, or to quench their thirst they will overeat on the grass which contains up to 80% water. A creep feed eliminates the need for the pigs to consume too much grass. The addition of milk products to the ration may result in overeating with a subsequent diarrhea. A uniform feeding practice will help to eliminate this hazard.

Hyponutritional factors fall under the following outline.

Cause. Almost any mineral or vitamin deficiency might have diarrhea as a symptom. However, since this discussion is limited to conditions primarily affecting baby pigs and since most nutritional deficiencies have their most serious manifestations in pigs beyond weaning age, this discussion might well have been omitted. But nutritional diarrheas do occasionally occur in baby pigs and deserve mention.

Predisposing Causes. A deficiency of minerals or vitamins in the sow's ration.

Age Incidence. Occasionally suckling pigs, but more often weaned shoats are affected.

Signs of the Disease. Pyridoxine Deficiency, poor growth, diarrhea, restlessness, unsteady feet, possibly long, rough, curly hair coats are all signs. Nervousness is sometimes present.

In cases of nicotinic acid deficiency (pig pellagra or deficiency enteritis), signs are: greasy feeling skins, sore mouths, poor vitality, mild scouring, unthriftness, dry scurfy skin, cessation of growth, occasional vomiting, emaciation, and loss of hair. Some may develop paralysis of hind legs and a few may get pneumonia. Fits or convulsions have been

noted. A deficiency of pantothenic acid is reported to cause poor growth, diarrhea, incoordination, "goose stepping," loss of hair, lacrimation with a resultant dark brown exudate around the eyes and dermatitis.

Riboflavin deficiency may cause anorexia, stunting, dermatitis, diarrhea with rectal hemorrhage and anal inflammation, sensitivity to light and a stiff gait. Mortality is low depending on severity of deficiency.

No outstanding lesions are noted at necropsy in cases of pyridoxine deficiency. In pig pellagra, a "garden hose" type of intestine is often noted. Inflammatory, diphtheritic and ulcerative lesions may occur throughout the gastro-intestinal tract. Lesions manifest by pantothenic acid deficiency are found in the large intestines. They include congestion, edema, superficial discrete ulcers and excessive mucus.

Diagnosis. An exact diagnosis could only be reached on laboratory analysis of the ration fed the sow, ration if any fed the pigs, and an analysis of the internal organs to determine the vitamin content. However, a presumptive diagnosis might be reached by considering history, signs of the infection, necropsy lesions and the lack of other findings.

Treatment. A chain of reactions is established by the deficiency of one element. So a primary deficiency of one element may lead to other deficiencies. In general, treatment should include an increase in the animal protein fraction of the ration, a milk supplement, an injection of a vitamin B complex. Also one may add 2 to 3 lb. of brewer's yeast per 100 lb. of the sow's ration. Vitamin B complex should be injected twice weekly to effect. B_{12} supplement and antibiotic residues may be added to the ration.

Prevention. Adequate, well balanced rations should be fed and undue stress avoided.

Infectious Diarrheas

Colibacillosis is frequently known as infectious scours, white scours, or systemic *E. coli* infection.

Cause. The cause of this disease condition is *Escherichia coli.*

Predisposing Causes. Poor sanitary conditions are usually evident. Pigs are born with a low immunity and when they start eating solid feeds they consume a certain amount of feces mixed with top soil. The intestinal tract becomes infected with organisms of the coliform group which in turn cause scours. There is some evidence to indicate antibiotics in the sow's ration or in the creep feed may cause the development of an antibiotic resistant *E. coli.* Since diarrhea weakens the intestinal tract, organisms normally considered as non-pathogenic may develop pathogenicity.

Age Incidence. This condition is sometimes found at one day to six weeks of age, but usually at two weeks to four weeks.

Signs of the Disease. This disease usually produces a rapid, and marked shrink or dehydration. Some of the pigs quit nursing. A diarrhea develops in a few of the pigs first, then it becomes more severe and spreads to other pigs in the litter and to adjoining litters. The feces are usually pasty and whitish or yellowish. The mortality rate may reach 50%.

The stomach may be empty or only partially filled at necropsy. Contents are usually slimy and watery. Mild to moderate gastro-enteritis is evident.

Diagnosis. History is important in helping to establish a diagnosis. There is no history of overfeeding the sows. The sows are not affected by the disease. It must be differentiated from transmissible gastro-enteritis, nutritional diarrheas, and edema disease.

Treatment. Move sows and healthy litters to avoid further contact with the sick. A variety of treatments have proved of benefit. Sows with affected litters may be given an initial dose of 120 grains of methenamine, followed with 60 grains of methenamine twice daily to effect. In addition or as an alternate treatment, sows may be given an injection of 1 gm. of Terramycin or oxytetracycline. Favorable response has also been reported from the use of neomycin-polymyxin mixtures

by injection into the sow. It may be well to reduce the sow's ration in order to decrease the milk flow and allow the intestinal tracts of the pigs time to recover. Where practical, individual dosing of the pigs with Furacin, sodium sulfathiazole, sulfaguanidine, streptomycin, or other anti-diarrheal preparations is beneficial. Individual injections of penicillin, streptomycin, or other antibiotics may be preferred. Hog cholera anti-serum (10 cc.) and/or 5% dextrose saline injections are beneficial. Bacitracin in the creep feed has been useful in controlling some outbreaks of infectious diarrhea.

Prevention. Hog houses and pens should be routinely disinfected between farrowings with lye solutions and clean fresh bedding should be added. Every effort should be made to keep sanitary standards high at all times, but especially so during farrowing periods.

Transmissible Gastroenteritis

Cause. The cause has not been indisputably established, but is known to be a filterable agent and thought to be a virus. This disease affects swine of all ages but its severest signs are manifest in baby pigs.

Predisposing Causes. No predisposing causes are known, although the disease spreads more rapidly when pigs are housed in communal housing units such as central farrowing houses.

Age Incidence. It may affect swine of any age but mortality in older hogs is negligible. The most serious losses occur in pigs under two weeks of age.

Signs of the Disease. The incubation period may be as short as 12 hours. The disease may spread rapidly throughout the entire herd affecting all age groups, or it may be limited to nursing pigs. In sows there may be vomiting, profuse diarrhea, agalactia, inappetence and a loss of weight. Feeder pigs may become affected, resulting in a rapid loss of weight and thus considerable economic loss. Older hogs usually show improvement within five to seven days and gradually recover.

Newborn pigs may become infected from the sow and often the entire litter dies within two days following birth. Baby pigs show extreme depression. Shivering and tremors have been noted. Pigs often vomit, but this is not a constant sign. They scour profusely and the discharge may be whitish, yellowish, or greenish in color. Milk may pass in the feces only slightly digested. Pigs often manifest thirst by standing near water troughs and appear to be drinking. Some pigs die within 24 to 48 hours and others may live for four or five days before dying. The pigs that survive may be stunted and unthrifty. Ordinarily, there is no rise in temperature. Mortality in pigs under five days of age is usually 100% and in pigs six to ten days old the mortality may be 60% to 70%. In pigs 11 to 15 days old 30% to 40% die. Pigs older than 16 days usually survive.

Pigs dying early in the course of the disease usually have the stomach filled with a firm, white, curd-like mass of undigested milk. The intestines are empty or nearly so. A white to yellowish green liquid or semiliquid may be present, and the intestines are atonic. The kidneys show gross evidence of degeneration, and in some outbreaks marked petechiaeation of the kidneys has been noted. Often, the mesenteric blood vessels are congested and inflammation of the mucosa of the stomach and intestines varies from moderate to no gross evidence of inflammation.

Diagnosis. Grinding up the internal organs of a pig affected with the disease and administering orally to a susceptible pig is a recommended method for diagnosing the disease. If typical signs develop in the pig receiving the oral inoculum, a diagnosis may be made. A serum-neutralization test has been reported but is more a research tool than a diagnostic aid. For practical purposes the disease may be diagnosed by its high mortality in young pigs and the finding of an undigested curd in the stomach and empty, gaseous intestines.

Treatment. There is no known effective treatment for this condition.

Prevention. Once an outbreak occurs

on a farm, the remaining sows should be completely isolated. Each sow should be farrowed in separate quarters. In large herds, farrowing should be discontinued for a month or so to help control the outbreak. It is often difficult to establish the source of an outbreak. It may have been brought in by visitors from other farms, or on farm machinery or other equipment. It is not definitely known whether carrier animals exist, but if there are carriers, it would not seem to be common among swine.

Oral immunization has been suggested as a means of preventing or controlling transmissible gastro-enteritis. Baby pigs that have the disease are sacrificed and ground up to a pulp and mixed in a tasty hog feed or slop. A portion is fed to the sow 15 days prior to farrowing. Sows thus immunized pass on immunity to their offspring. Veterinarians have reported keeping frozen material on hand for such immunizing procedures. The disadvantages to this method are obvious; however, in the face of severe outbreaks, when it seems the entire pig crop is going to be lost, desperate measures seem necessary.

Sows that lose litters from this disease, may farrow the next litter without any trouble developing from the disease. Infected pigs that recover develop substantial immunity and so may be kept for breeders. Exposure seems to develop immunity. The passive immunity developed in recovered animals protects their offspring during their period of highest susceptibility. Thus, the disease may not recur until introduced on the farm through new non-immune breeding stock. Extreme caution should be exercised when adding new swine to the drove, particularly at breeding time. Replacement stock should be isolated for three weeks or more.

Intestinal Threadworm

Cause. *Strongyloides ransomi* — the intestinal threadworm. A free living and a parasitic phase or both occur.

Predisposing Cause. Damp, shaded areas are predisposing causes.

Age Incidence. The condition may occur in any age animal, but symptoms of infection are observed only in pigs three to six weeks of age.

Signs of the Disease. These parasites gain entrance to the host by (1) ingestion or by (2) penetration through the skin. Pigs become restless, appetite is reduced, a diarrhea develops, nausea and vomiting occur, the skin becomes wrinkled, dry and scaly, skin and visible mucous membranes reflect anemia by their pale color, respiratory difficulty becomes evident, heart beat is increased and rate of growth is slowed. There may be sudden death in healthy pigs when exposed to highly infected premises. Strongyloides affect hemoglobin synthesis and younger pigs usually begin to show improvement as soon as they obtain feeds with adequate copper and iron. Older pigs and hogs are not usually affected by this parasite since they obtain milk and other feeds that have an adequate supply of iron and copper. The mortality rate depends on the degree of infection and the nutritional state of the pig.

Due to their migratory habits, petechial hemorrhages may be found in the bronchii, esophagus, heart, stomach, and intestinal mucosa at necropsy. Pericarditis may occur.

Diagnosis. Eggs may be found in the feces, but this can not always be considered diagnostic. At necropsy a tentative diagnosis may be made in the following manner: Remove and open the small intestines and place them in a clean glass bowl containing warm water. Let them set for a few minutes and then place the bowl over some type of light so that the light shining from underneath the bowl clearly reveals its contents, (a brucellosis plate testing box serves as a good light source). Intestinal threadworms, if present, will appear as barely visible, hairlike, whitish worms. Place some of the worms on a clean glass slide and view them microscopically under low power.

If they are *Strongyloides ransomi* they will be filled with eggs. In addition take some of the intestinal contents and do a fecal flotation and look for embryo-

nated eggs. The diagnosis should be confirmed by a parasitologist. Finding the third stage larvae in the musculature of the myocardium, tongue, brain, spinal cord and lungs will also confirm the diagnosis. The disease is marked by a high eosinophil count, but eosinophils may disappear in fatal cases. These parasites should not be confused with the swine hookworms since the latter are found in older swine and do not pass embryonated eggs."

At necropsy, there is usually an inflammation of the small intestines.

Treatment. There is no known treatment.

Prevention. Sanitation—dry, unshaded quarters—is imperative.

Other Causes of Diarrhea

Erysipelas in baby pigs may be manifest primarily as a diarrhea. Other known causes of diarrhea include anemia, Salmonellosis, streptococcic septicemia, toxoplasmosis, navel ill, hypoglycemia, uremia-toxemia, hog cholera, testeriosis and vibrio infection.

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Concluded on page 84

This comprehensive working reference will be concluded in future issues under the major headings of central nervous system involvement, respiratory diseases, diseases manifesting skin lesions and diseases of the sow causing abortion, premature birth or weak pigs. References will be included with each subject for the convenience of the practitioner. Requests for bound volumes of this complete series may be directed to VETERINARY MEDICINE, *Livestock Exchange Bldg., Kansas City 2, Missouri.*

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DISTEMPER INCLUSION BODIES

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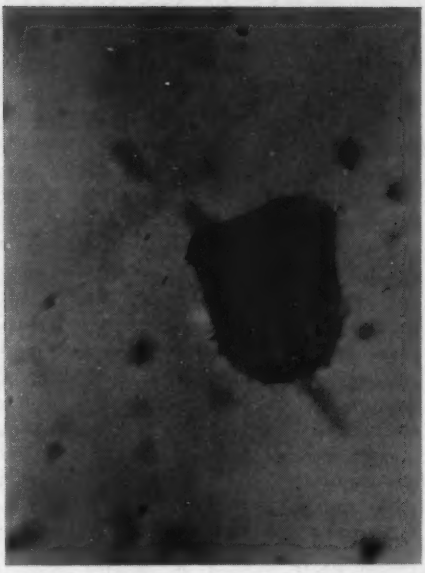

Fig. 1. Inclusion bodies in vaginal epithelial cell of normal Beagle.

FOLLOWING THE INITIAL DEMONSTRATION by Lentz[1] of distemper inclusions in nerve cells of dogs dying of distemper, numerous investigators have observed these structures.[2,3] Veterinary clinicians have always been interested in the development of laboratory tests that would provide supporting evidence for a clinical diagnosis of distemper. Broadhurst, *et al.*,[4] describe nigrosin-staining intracytoplasmic inclusions in the nasal epithelial cells of dogs in the active stages of distemper. The inclusion bodies are described by these workers as being one half to two microns in diameter, considerably smaller than the nasal inclusions described by Sanfelice.[5] Goss, *et al.*,[6] advocate conjunctival or tongue scrapings for the detection of obscure or atypical canine distemper. These authors recommend hematoxylin and eosin staining. The inclusions in their study varied in

Fig. 2. Photomicrograph of smear for demonstration of distemper inclusions.

size from less than one half to ten microns in diameter. They were demonstrated as early as five days after the observance of symptoms and were seldom found later than three weeks after symptoms occurred.

Lindgren[6] suggests smears of nasal mucosa or from the vagina in females or the urethra in males for the demonstration of distemper inclusions. Cello[7] observed inclusions in conjunctival scrapings stained with Giemsa. He also points out that the cytoplasm of epithelial cells of inflamed eyes may contain phagocytized white cells, bacteria, nuclear remnants, keratin precipitates, and pigment granules which may be confused with specific inclusions. The finding of intracytoplasmic inclusion bodies in epithelial cells, multinuclear epithelial cells, and mononuclear cells in conjunctival smears may, Cello believes, be associated with canine distemper.

The purpose of this study was to investigate, on a small scale, the validity of this clinical laboratory procedure. Preliminary evidence is provided which indicates that smears stained by conventional methods are difficult to interpret and may lead to incorrect diagnoses. Also it was hoped to determine if inclusions would appear in the epithelial cells of accessible mucous membranes as a result of distemper vaccination with living modified distemper virus vaccines.

Materials and Methods

Control dogs for this study were obtained from two sources. Adult Beagle females, one to three years of age, were sampled at the normal dog colony of the College of Veterinary Medicine. These dogs had been vaccinated for distemper at approximately seven and nine weeks of age with Haig's Onderstepoort egg adapted distemper vaccine of the 86th to 90th passage level. The dogs had no known exposure to virulent distemper virus. The dogs are housed in the immediate vicinity of approximately 400 distemper susceptible ferrets and joint caretakers handle both groups of animals. Inasmuch as there has been no distemper infection of the ferrets in these quarters, it would not seem likely that the dogs have been exposed to virulent distemper virus.

The other "controls" were brought to the veterinary clinic for routine procedures as bathing, clipping, parasite examination, or treatment of conditions other than those resembling distemper. This latter group included cases of pyometra, pneumothorax, acute gastritis, and similar entities. Dogs of this group could have been simultaneously infected with distemper.

Clinically diagnosed distemper cases and dogs suffering from illnesses resembling canine distemper were also obtained from two sources. One source of material were dogs presented to the clinic for treatment of illnesses diagnosed as canine distemper or conditions which might be confused with canine distemper. The latter category included such respiratory infections as bronchitis and bronchopneumonia, and one case diagnosed clinically as infectious canine hepatitis.

Samples were also obtained from cases of canine distemper diagnosed by other veterinary practitioners in the area. Some of these cases were verified histopathologically.

In addition to the dogs utilized in the survey, a litter of seven recently weaned Shepherd dogs from a farm was obtained for the vaccination trial. These dogs were kept in limited isolation quarters during the course of the experiment.

Staining Procedures

Nasal smears and pharyngeal and tongue scrapings, although employed by other workers, were not consistently used in this study. Many dogs object, rather violently, to this method of collection and therefore the method was abandoned. Conjunctival scrapings were obtained from all dogs by scraping lightly on the conjunctiva with a scalpel. Urethral and preputial smears were obtained from males and vaginal smears from females by inserting and rotating a dry glass stirring rod.

A drop of sterile saline solution was

placed on a dry slide and the scalpel or glass rod dipped into it and rotated or rolled to spread the cells over approximately an inch area. The slide was then air dried, fixed in methyl alcohol for two to five minutes and again air dried. Several staining procedures such as Sellers, Williams, Giemsa, Hematoxylin and Eosin, Wrights, and Pollak's tri-chrome were used. The most consistently satisfactory results were obtained with Pollak's trichrome. The method of staining was that previously described by Gorham.[8] With this method inclusions stained a rather homogeneous crimson color in contrast to the grayish-purple cytoplasm. The inclusion bodies were round or oval in form and varied from one half to ten microns in size.

Experiment 1

The results of staining conjunctival scrapings and vaginal or urethral and preputial smears for the demonstration of distemper inclusions are presented in table 1. It is noteworthy that the highest incidence of inclusions occurred in the dogs from the normal dog colony. The number of inclusions seen varied from a few in a low percentage of cells to many inclusions in the majority of cells. Figures 1 and 2 are photomicrographs of smears from two of these dogs.

In contrast to this finding, the lowest percentage of dogs showing inclusions were the dogs in the other "control" group. These dogs ranged from eight months to ten years of age. Both sexes were represented. All dogs had been vaccinated, but none had been vaccinated within a month preceding sampling. It is believed that this group constituted a representative sampling of non-distemper infected dogs such as seen by a veterinarian in practice. The one positive animal in this group was a normal female approximately four years of age. A five year old male Terrier which had been kept in the immediate vicinity of known cases of canine distemper for two years did not exhibit inclusions.

The examinations of this group of dogs would tend to corroborate Broadhurst's findings[4] that healthy dogs of unknown history often show a few, infrequent inclusion bodies in smears from nasal mucosa. The persistence of inclusion bodies in conjunctival and vaginal or urethral smears of normal Beagles not exposed to distemper is difficult to explain. It is possible that these bodies may simply represent what may be termed normal structures.

TABLE 1. Inclusion Bodies in Epithelial Smears from Living Dogs

Identity	Number of Dogs Sampled	Number Showing Inclusions	Percentage Showing Inclusions
Group 1. Controls			
W.S.U. Beagle colony	5	5	100%
W.S.U. Vet. clinic (non-distemper cases)	8	1	12.5%
Subtotal controls	13	6	46.2%
Group 2. Canine Distemper			
Clinical Distemper cases (verified by histopathology)	6	1	16.7%
Clinical Distemper cases (recovered or not necropsied)	5	3*	60%
Subtotal canine distemper	11	4	36.4%
Group 3. Entities Resembling Canine Distemper	7	2	14.6%
Total	31	12	38.7%

*One smear in this group was classified as suspicious, as only a few small inclusions were seen.

Only one of six cases of canine distemper subjected to histopathological verification showed the presence of inclusion bodies in epithelial smears. This case was sampled early in the course of the disease. Two of the other verified cases of canine distemper were also classified as early cases, but did not show inclusions in repeated smears. The other three dogs in this category might be classified as chronic distemper. They did not show inclusions in smears. Characteristic inclusion bodies were numerous in the epithelial cells of the bladder in all dogs in this group on microscopic examination following postmortem. The rather low percentage of inclusions found in epithelial smears from known distemper cases would tend to indicate that this test is not reliable for diagnosis.

Coffin and Liu[9] were able to demonstrate specific distemper viral antigen in conjunctival smears by fluorescent antibody staining in seven out of seven acute cases of canine distemper, but in none of seven cases of chronic distemper. Conjunctival smears taken from five dogs suffering from diseases other than distemper did not show specific antigen using this method. These authors believe that fluorescent antibody staining is easier and more specific than the demonstration of inclusions by conventional stains.

Five dogs are included in the category of non-confirmed clinical distemper cases. All dogs in this group had catarrhal and nervous signs resembling typical canine distemper. Two animals died but were not examined at necropsy. The other three recovered after a prolonged period of illness. All of these cases would have been classified as chronic distemper by Coffin[9] at the time epithelial smears were made. Smears of two of the five dogs in this group showed numerous inclusions and a third showed a few small inclusions in a low percentage of cells.

Epithelial smears were taken from seven dogs with illnesses which often resemble canine distemper. The two positive smears in this group of dogs were from one dog with infectious canine hepatitis and one dog with an upper respiratory ailment. It is quite possible that a concurrent distemper virus infection could have been present; however, all dogs in this group recovered rapidly in response to specific therapy. These cases were differentiated from distemper on the basis of history, clinical symptoms, course of the disease, and response to therapy.

A review of the literature indicates that the demonstration of distemper inclusions in epithelial scrapings from the living animal seems a rather unreliable clinical procedure for the diagnosis of canine distemper. The procedure is bestrewn with such obstacles as artifacts and inclusions in healthy animals and the lack of inclusions in animals chronically ill with canine distemper. The use of fluorescent antibody staining overcomes some, but not all, of these difficulties.

The results of the survey described above provide further evidence that the finding of inclusion bodies in epithelial smears does not necessarily indicate that the patient is suffering from clinical canine distemper nor does the lack of inclusions in similar smears eliminate a diagnosis of canine distemper. It seems that the results of staining conjunctival scrapings with specific fluorescent antibody as reported by Coffin[9] is a more specific test but even so the same precautions in interpretation must be advised.

Experiment 2

The purpose of this scouting trial was to determine the effect of living modified distemper virus vaccines on the appearance of inclusions in the epithelial cells of accessible mucous membranes.

A litter of seven recently weaned farm dogs of Shepherd breeding, approximately eight weeks of age, were obtained and placed in limited isolation quarters. There were five females and two males in this litter.

Conjunctival smears from all dogs, preputial smears from the males and vaginal smears from the females were all negative for inclusions. Three of the

females and one male were vaccinated with Green's distemperoid virus,* and the other two females and one male were vaccinated with Haig's Onderstepoort egg adapted distemper vaccine.*

Following vaccination, scrapings were made until inclusions were found, or 22 days had passed. On the 11th post-vaccination day, all smears were negative with the possible exception of one dog vaccinated with Green's distemperoid. Examination of this slide revealed cytoplasmic eosinophilic bodies which could possibly be interpreted as doubtful inclusions. On the 16th day after vaccination, all the dogs vaccinated with distemperoid and the male dog vaccinated with the egg adapted virus showed what were considered to be inclusion bodies in the epithelial cells. The two females vaccinated with the egg adapted virus did not show inclusion bodies on the 18th, 20th or 22nd day post-vaccination, and the experiment was terminated. No dog showed clinical evidence of distemper during the course of the experiment. No effort was made to determine the persistence of the inclusion bodies.

Summary

Inclusion bodies resembling those described for canine distemper were found in stained epithelial smears made from the conjunctiva, vagina, and urethra or prepuce of normal dogs, dogs with canine distemper, and dogs with illnesses resembling but not believed to be canine distemper.

Although this procedure may provide additional information to be interpreted in the diagnosis of clinical distemper, in our hands, no diagnostic significance could be attached to the finding of inclusion bodies in epithelial smears from the living animal.

Inclusion bodies appeared in epithelial smears made from the conjunctiva, vagina or prepuce and urethra between eleven and sixteen days following vaccination with ferret or egg adapted modified living distemper virus vaccines. They were more numerous in dogs vaccinated with ferret adapted distemper virus than in dogs vaccinated with egg adapted distemper virus.

*The Green's distemperoid vaccine was obtained through the courtesy of Fromm Laboratories, Grafton, Wisconsin. The Haig Onderstepoort virus was eighty-sixth egg passage level.

Acknowledgment

The results reported are based on a survey conducted as a special problem by the senior author as a senior student in the College of Veterinary Medicine, W.S.U. The authors are indebted to Doctor G. R. Spencer and Doctor D. W. Fluharty of the Department of Pathology for their counsel and aid.

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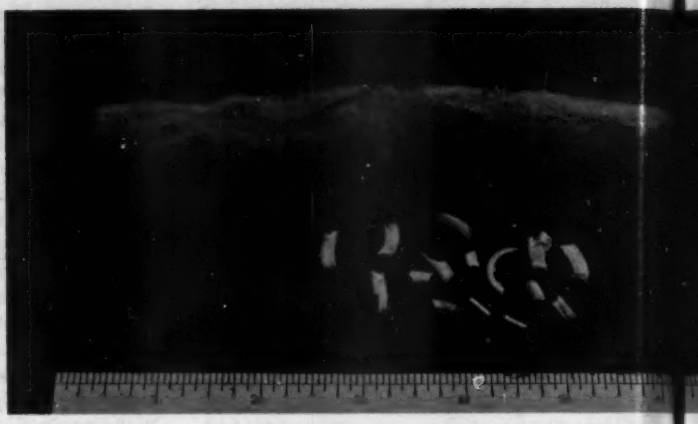
FELINE FURBALLS



W. R. McCUISTION, D.V.M.
Fort Worth, Texas

A BETTER UNDERSTANDING of feline furballs is gained by studying related mechanisms found in different animal species. Biological patterns such as the cat's habitual licking of the coat and a tongue designed to compel the swallowing of hair, usually indicate a logical function obscured in the background. It is well known that hawks and owls, after devouring small vertebrates, disgorge the indigestible parts of their victims in the form of pellets with bones inside and fur and feathers outside.

Furball Contents

The interior of a feline furball reveals a number of variants. These variations appear to be influenced by the environment of the subject and the season of the year. Cats caged in catteries, usually show only hair in their furballs. Cats permitted to roam and hunt may present small animal teeth, claws, beaks, bones, scales, insects and grass burrs within the entanglement of hair.

The Canine Grass Bolus

Dogs swallow some hair but this does not accumulate readily in the stomach as it does in cats. The dog often acquires a surplus of sand and grit through the eating of its food from the ground or through the removal of mud from between the toes or the body. The stomach is cleansed by the eating of grass. Grass eating induces vomition and provides material for the formation and bulk of a bolus, which may serve as a swab but is a poor imitation of a feline furball.

Aged dogs are prone to have impactions of the colon with the fecaliths commonly containing fragments of sharply chipped bone, many of which are incompletely imbedded within the coproliths. Cats handle such problems to a much better advantage with sharp bones well cushioned in conveyors of hair so that these can be moved to the exterior with a minimum of discomfort and trauma.

Cattle Cuds

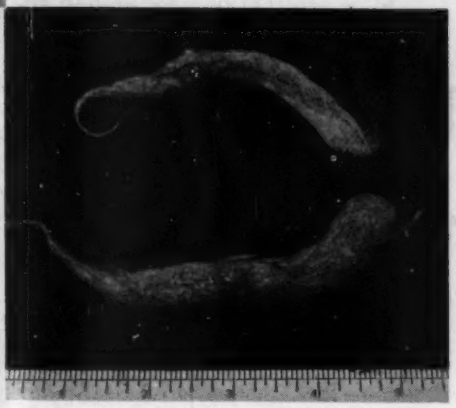
The ruminant cud mechanism is imperfect in raising small grains for remastication unless these are well enmeshed in a suitable bolus of roughage; otherwise, many of the whole kernels will pass through the gastrointestinal canal. Dentistry may be indicated in some instances, but feeders find it better to grind feed as the best means for overcoming this defect and subsequent waste of grain. The incidence of hardware disease might be reduced if cattle could handle hair as adequately in their stomachs as the cat.

LEFT

Feline furballs serve as a protective type of conveyor for the removal of injurious and indigestible objects from the gastrointestinal canal. The teeth and bone chips shown resemble those of a young rabbit. These with their furball came from a cat in suburbia.

BELOW

Many of the smaller furballs show a blade of grass attached as shown above which may act as a trigger for disgorgement. Cats which have been deprived of their hunting, devouring of prey and the picking of grass to eat as may be needed are most subjected to furball obstruction.



Early Medical Methods

The old time family physician prescribed with good results the eating of large portions of warm, fresh baker's bread for children who had swallowed buttons, pins, coins etc., followed with a dose of the emetic ipecac.

A soft drink company was at one time obliged to retain the services of a glass eater from the circus who would make appearances and eat glass before the jury during lawsuits filed by people who had found particles of glass in their pop bottles. We understand, the expert witness would later retire to his hotel room where he would use the old physician's bread-ipecac method after astonishing the members of the jury.

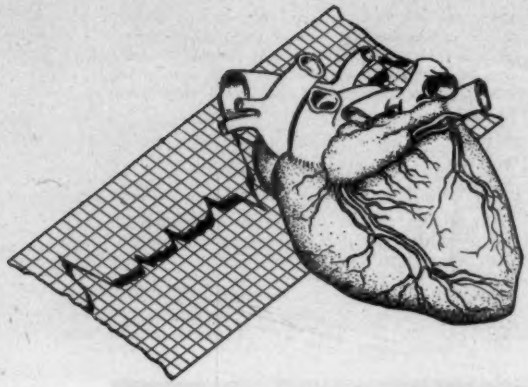
Cats will pass needles with the caudad pole tightly bound with hair resembling a large headed pin and the remainder in feces. We have seen a number of non-contagious cases of aloplecia areata in cats that were apparently associated with foreign bodies internally. This baldness occurred in different regions of the body because of incessant licking of the coat. Then, following the surgical removal of these objects from either the soft structures or the alimentary tract, a diminished desire to lick hair was evidenced through the uniform growth and development of a new furry coat.

Emetics vs. Lubricants

Many of the cases involving feline furballs will show an immediate and favorable response to the administration of mineral oil served with sardines. Our experience has been that a lubricant is more indicated than either an emetic or a drastic purgative.

In those canine cases, where there is nearly always a need for more substance to complete bolus formation and where veterinarians are urged by clients to do something about "grass eating," Siblin (PD & Company), a water absorbent material from plantago, which resembles a cereal, may be lightly sprinkled over the food for a few days.

This preparation swells with water and produces a rubber-like stool which engulfs fine particles of gritty matter that is not easily disgorged by the average canine, notwithstanding the animal's ability to vomit freely and almost at will.



CARDIAC RESUSCITATION IN THE DOG

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CARDIAC RESUSCITATION in the dog can be a successful procedure involving simple technics and simple apparatus. The veterinarian is frequently confronted with cardiac arrest cases, or cases of apparent sudden death. Many of these fatalities occur while the patient is under general anesthesia. They can occur during either minor or major surgery. They are also encountered in a variety of other situations; some in which anesthetics are not involved. Regardless of the situation or cause, in cardiac arrest the heart is either in ventricular fibrillation, or ventricular standstill. In both cases the circulation of blood is no longer possible and the consequences are the same unless proper resuscitative measures are taken.

When faced with a case of apparent cardiac arrest one must first determine whether the heart has really stopped beating. This decision must be made rapidly. Time lost in searching for the pulse or heart beat may make resuscitation impossible. Irreparable brain damage results if adequate circulation and oxygenation are not restored within approximately three to five minutes.

Resuscitation Procedure

Resuscitation of the heart is of no avail unless at the same time there is proper oxygenation of the lungs. These cases serve to emphasize the importance of tracheal intubation as a routine procedure in all patients undergoing general anesthesia.

Adequate ventilation is probably best attained by administering 100% oxygen under positive pressure. In reality the treatment of such cases involves cardiopulmonary resuscitation rather than cardiac resuscitation alone.

It is not uncommon in cases of cardiac arrest to first give an intracardial injec-

tion of epinephrine followed by massage through the unopened chest. Such conservative procedures have met with some success and may be tried as initial measures. If the response is not immediate, however, the conservative approach must be abandoned for more radical procedures. The chest must be opened, the heart massaged directly and adequate ventilation established. Once this has been done the emergency is over. From here on, other steps toward successful resuscitation can be made with less haste. Promiscuous use of epinephrine should be avoided as it sometimes causes a weakly beating heart to fibrillate.

On opening the thorax, it is usual to find the heart in one of two states: cardiac fibrillation, or ventricular standstill. In either situation, proper cardiac massage and adequate ventilation are the first steps toward successful recovery. Under this treatment, the heart in ventricular standstill may soon respond with a normal coordinated rhythm or it may develop the uncoordinated rhythm of ventricular fibrillation.

Whenever ventricular fibrillation is encountered in the dog the only recourse to successful resuscitation is chemical or electrical defibrillation, and the latter is by far the more effective. Usually massage alone or in combination with cardiac stimulants will not lead to recovery. On the other hand, the cat's heart because of its small size usually recovers spontaneously from ventricular fibrillation.

An electrical apparatus devised for defibrillating the heart has been described in the *Journal of the American Veterinary Medical Association*, February 1, 1958. The apparatus includes a step-down transformer with a voltage range from zero to 100. A voltage of 80 is usually adequate to defibrillate the dog's heart. The electrodes are covered with saline-soaked gauze to prevent myocardial burning and to afford better electrical contact.

When presented with a case of sudden death or cardiac arrest where the pulse and heart beat are no longer perceptible, a state of emergency exists. Deliberate, immediate and purposeful action must be taken. Valuable time must not be wasted. Conservative procedures, unless met with immediate success, must be abandoned for more radical measures.

The first step is to establish adequate ventilation. Then a rapid thoracotomy is performed. There is no time to waste in determining the proper rib interspace. This is an emergency and in most cases strict asepsis is not observed. Time is the important factor. In opening the chest take care not to cut the lung tissue.

Cardiac Massage

Proper massage must take place as soon as the heart is reached. This is true whether the heart is in standstill or fibrillation.

There are a number of ways of carrying out proper massage. For instance, the whole ventricular mass can be cupped in the palm of one hand and massaged by alternately opening and closing the hand, or one can massage the ventricles between the closed fingers of one hand and the opposite thoracic wall. Other methods can be used with success. No matter what method is used there are certain rules to which one should adhere. Cardiac massage should be carried out at a rate of about 50 times each minute. The method used must not create undue myocardial bruising or other damage. The ventricles, following each manual compression must be allowed to relax fully so that proper diastolic filling can occur. Massage when carried out too rapidly also prevents proper filling.

In those cases that respond to massage, it is usually unnecessary to open the pericardium. If the heart is fibrillating, however, it will be necessary to open the pericardial sac to properly defibrillate it. It is also true that massage is best carried out inside the pericardium. In opening the pericardium avoid severing the phrenic nerve.

In actual cases, considerable amounts of blood will be pooled in the liver and splanchnic region making it unavailable to the heart. In such cases "massaging" forward and over the liver and other abdominal viscera aids in moving the

blood toward the heart. Fluids should also be started at this time, or as soon as possible. Ringer's solution is considered of value in these cases because it contains ions favorable to cardiac function and also reduces the hemoconcentration which is usually present. Blood is better than Ringer's solution in many respects but it does not reduce hemoconcentration as well.

The object in defibrillation is to stop all the uncoordinated, vesicular movements of the myocardium. This gives the ventricular muscle an opportunity to start again with a normal rhythm. There is a chemical means of defibrillating the heart but it has not been too successful. It consists of the administration of potassium to stop the heart followed by calcium to start it again.

Electrical defibrillation is carried out by pressing electrodes on opposite sides of the myocardium and applying an electrical current for a fraction of a second. Eighty volts for this short interval of time is usually sufficient to stop all heart action. If followed by massage the heart usually starts beating again with a normal rhythm. If defibrillation was unsuccessful it can be repeated and the voltage and time interval increased if necessary.

Effecting Closure

Before closure of the chest be sure that the heart is going to respond. Remember that in most cases one is dealing with a contaminated surgical field. Consequently the first step would be to remove the hair and debris and clean the wound edges as well as possible.

Closing the pericardial sac is arbitrary, although whenever practical it should probably be done. Antibiotics should be introduced into the thoracic cavity to help control infection. Closure of the chest wound is carried out using routine surgical procedures.

Negative pressure in the intrapleural space should be re-established. Air can be aspirated from the chest through a needle attached to a syringe with a three-way valve.

Cardiac resuscitation is not always successful even though carried out properly. A common reason for unsuccessful resuscitation is that the critical time limit has been exceeded and as a result the heart and the integrative centers in the brain that control cardiac as well as respiratory function have been seriously jeopardized. Such cases usually show some response but proper function cannot be maintained. Success has been achieved in several dogs whose hearts have been stopped for as long as ten minutes but this is not the usual situation. Temporary blindness seems to be one indication that the critical time limit has been exceeded.

Acknowledgment

This report was presented at the 26th annual meeting of the American Animal Hospital Association, Colorado Springs, May 6-9, 1959.

Prostatic Abnormalities

Reports are being made increasingly by pet animal practitioners about prostatic abnormalities in dogs that are usually more than five years of age. The conditions are (1) hyperplasia due to hormonal imbalance; (2) specific non-suppuratives—tuberculosis, blastomycoses, coccidioidomycosis, etc.; (3) abscessation with or without hyperplasia; (4) retention cysts; (5) malignancies; (6) atrophy following emasculation, and the opposite condition "congestion" in those used excessively for breeding purposes.

Fig. 5. A line drawn horizontally between lateral corners of the eye sockets, and dissected by a vertical midline upward from the tip of the nose to the top of the skull, indicates points where sinuses are accessible for trephining.

IV-Anemia and Other Anomalies

CAT PRACTICE

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THE COMMON SYMPTOMS of empyema are lethargy, weight loss, inappetence, cough, thirst, labored abdominal breathing, and sudden dyspnea, after being moderately ill for a week or so. Often empyema develops in adult cats without any apparent predisposing illness. Frequently the affected cat lies on its sternum, or sits on its haunches, and exhibits slow, labored mouth breathing, as well as cyanosis, dilation of the pupils, and high temperature. An *x*-ray film taken in a standing position, usually shows a bilateral horizontal line of fluid level in the chest.

For treatment the chest may be tapped aseptically at any easily accessible point between the ribs, below the level of fluid. Immediate, although transient relief results. The fluid withdrawn may be used for making cultures and antibiotic sensitivity tests for guidance in therapy. Administration of oxygen often is beneficial.[18,19,20]

Viral infections may result in inflammation of the frontal sinuses, and filling of the sinuses with exudative materials. Discomfort, sneezing, nasal and ocular discharges, and extension into other respiratory passages may result.

Trephining, irrigation, and drainage of the frontal sinuses provides immediate relief, and often complete correction of the problem. The correct locations for trephining are found by drawing a connecting line horizontally between the lateral corners of the eye sockets, and a vertical midline extending upward from the tip of the nose to the top of the skull. The anterior lateral corners formed by the intersection of these lines are the points where these sinuses are accessible, (Figure 5).

A small, sterilized wood drill makes a suitable instrument. Under general anesthesia, a slit is made in the skin at the points designated and the trephine openings drilled with gentle pressure through the underlying bone, (Figure 6). Irrigation of the sinus through these openings removes the exudative material, and healing usually is uneventful.

Ear Mange

The ears of cats presented for treatment should always be examined. An otoscopic examination often can be made while the patient's temperature is being taken. Heavy scales, dirt and other debris, and the ear mite (*Otodectes cynotis*) are often present in the ear without causing evident symptoms. Treatment with Canex (Pitman-Moore) or other oily parasiticides is simple and effective.

Osteogenesis Imperfecta

Osteogenesis imperfecta is being recognized more frequently, especially in Siamese and Burmese cats. A simple recessive hereditary factor may be involved.[21]

Diagnosis is aided when there is a history of sudden onset of lameness, with severe pain generally only in the hind quarters. It is often seen as early as the kitten can play vigorously. Incomplete fractures generally occur in the legs and spinal vertebrae, and radiographs show a frail "egg shell" bone structure.

Treatment consists of confinement in a small area to restrict exercise for several weeks, or until the permanent teeth have erupted. Skeletal development may be accelerated by giving Repositol—Pitman-Moore diethylstilbesterol (0.25 mg. per pound body weight) to females, and Repositol testosterone (0.5 mg. per pound body weight) to males, every three weeks. Prevention is by elimination of affected cats from breeding stock.

Nutrition

In nature, the diet of cats is naturally concentrated. Therefore the diet should be relatively high in protein, fat, vitamin A and vitamin B complex, but lower in vitamin D and fiber. Since horse meat contains less fat than beef, a continual diet of horse meat usually needs to be supplemented with fat and vitamin D. Low ash foods, such as meat, dairy products, liver and kidney should be fed in order to avoid the development of urinary tract calculi, and also as a part of the treatment of this condition. Raw liver is eaten readily, a liking which may be related to the high vitamin B complex requirement of cats.[22]

The vitamin B_1 or thiamine requirement of cats is about four times greater than that of dogs. Thiamine deficiency may be common in cats which are fed excessive amounts of whole fish. Certain species of fish contain an enzyme, thiaminaze, which inactivates vitamin B_1 in products stored under ordinary marketing conditions. Many cat foods consist largely or entirely of whole fish and have sometimes been involved in thiamine deficiencies after prolonged periods of feeding. The symptoms of thiamine deficiency are anorexia, weight loss, vomiting, excessive salivation, ataxia, and prostration. It should not be confused with streptomycin toxicity which produces similar symptoms in cats.

Diagnosis and Treatment of Thiamine Deficiency

When a cat with vitamin B_1 deficiency is suspended by its hind legs, the head is held in dorsal flexion (to the spine). The patient cannot jump from the table, but falls in a somersault when handled and often in advanced cases it cries out, becomes rigid and convulsions are seen. A reddish discolor-

Fig. 6. Trephining can be accomplished with a small, sterilized wood drill.

ation of the gum at junction with the teeth often appears as the earliest sign of thiamine deficiency. Blindness with no visible lesions (amaurosis) is common.

The normal cat, when suspended by the hind legs, holds its head ventro-flexed (to the sternum), and does not show any of the other signs of deficiency.

Thiamine deficiency responds rapidly to the administration of vitamin B_1, 50 to 100 mg. intramuscularly, as frequently as necessary. Oral administration also is satisfactory and, for further improvement, the amount of fish in the diet should be decreased.

Vitamin E Deficiency

A deficiency in vitamin E often develops in cats fed largely on commercial cat foods, resulting in steatitis or "yellow fat."[33] Symptoms include rough hair coat, lethargy, anemia, lameness and terminal convulsions. The oral administration of alpha-tocopherol in adequate dosage will generally correct this problem.

Vitamin A Deficiency

Cats with vitamin A deficiency show weight loss, serosanguineous exudate around the eyelids, and an apparent muscular weakness and incoordination, particularly of the rear legs. The speed with which these changes develop is inversely related to the age of the animal at the time of onset. Additional changes include squamous metaplasia of the conjunctiva, salivary and other glandular epithelium, uterus, and respiratory epithelium. It has been observed that better absorption of vitamin A is obtained in cats on high fat diets. This relationship between vitamin A absorption and dietary fat content suggests cats may not obtain adequate vitamin A from many commercial cat foods alone.[34]

Cystic and Urethral Calculi

This condition has often been in progress for a considerable time before the veterinarian sees the case. It occurs chiefly in the males, and often in those castrated at three to four months of age. It is believed by some that early castration may prevent development of the urethra to its maximum diameter, thus interfering with the free flow of fluids and solids.

However, the etiology is obscure and many theories have been advanced. It appears that a metabolic imbalance with predisposition in certain individuals may be involved.[35] Deficiency of pyridoxine in the diet has been shown to be contributory.[36] Other predisposing causes include: infection in the urinary tract; retention of urine in the bladder for too long periods; inadequate fluid intake; improper diet, usually of high ash content (often fish in large quantities); some nucleus for plug formation in the bladder; deficiency of vitamin A and/or fat in the diet, and alkalinity of urine.[37]

The owner may palpate the abdomen and, mistaking the grossly distorted bladder for an accumulation of fecal material, administer a strong laxative. Naturally this produces no relief, and further weakens the already severely toxic patient. Relief of bladder distension can be achieved most quickly by abdominal puncture, aseptically as practicable. A 20 to 22 gauge needle is used to withdraw the urine and to irrigate the bladder with saline solution or other fluid of choice. Hazards of this procedure include possible infection of the bladder, and spilling of infected fluids into the abdominal cavity.

More lasting relief may be obtained under anesthesia by passing a suitable probe into the urethra to dislodge obstruction. Irrigation by forcing fluid through the urethra into the bladder, and returning by pressure on the abdomen, often will remove the offending material.

If urethral obstruction persists, a permanent opening for the passage of urine may be made surgically in the ventral abdominal wall. The end of the urethra is sutured to the skin and muscle and, following this operation, the cat has control of urination through the sphincter muscle at the bladder neck. He easily learns to urinate in a crouched position, much like a female, and results have been satisfactory in some cases.[28]

Consideration should always be given to preventing recurrences of the obstruction. Practical measures which can be used to advantage include the following:

1. Acidity of the urine should be maintained. Often the owner can test the urine with litmus paper at home. Acidification can be accomplished by the oral administration of Chlor-Ethamine (Pitman-Moore) tablets or some similar medication.

2. A low ash diet with adequate vitamin A and high protein should be fed.

3. The administration of antispasmodics such as Renzol (Pitman-Moore) tablets helps in the control and relief of urethral spasm.

4. Frequent urination should be encouraged by providing adequate facilities, such as a suitable pan.

5. Antibiotic sensitivity studies in urinary infections aid in selecting effective medication.

6. The owner should be cautioned to watch the patient closely for evidence of even light straining at urination, so treatment can be given early.[29]

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The best books on veterinary medicine and surgery during the first half of the last century were several editions of William Youatt's works, *The Horse, Cattle, Sheep, The Dog,* and *The Pig.*

The Horse, first published in London in 1831, appeared in print here in 1843, and again as late as 1879. Tens of thousands of copies were sold and it was a standard reference in American courts for years.

Here each month are published ideas, suggestions and comments picked up by VM reporters.

Small Animal Clinic

Eosinophils

Allergic manifestations are associated with an increase of eosinophils. Dr. Frank Mueller describes a valuable diagnostic aid he has found for confirming the allergic nature of a nonspecific diarrhea, skin lesion and other related phenomena. The Hansel stain technic provides excellent identification of eosinophils. If a smear from a skin lesion, mucosa or even feces exhibits a high percentage of eosinophils the presence of an allergic condition is strongly suggested. The technic is described in standard laboratory manuals and can be conveniently carried out in the practitioner's laboratory.—Dr. Mueller presented his report at the Florida State Meeting.

Cat Litter

An inexpensive source of highly absorbent cat litter is a local garage. They buy material identical to cat litter in large quantities and very reasonable prices.—*J. A. McOwen, D.V.M., Boynton Beach, Florida.*

Household Pets and Disease

Household pets, rapidly increasing with population, are becoming more of a potential source of disease, it was reported in the Christmas edition of *What's New*, Abbott Laboratories publication for the medical profession.

"Viral diseases acquired from pets are probably much more common than is realized," the article states. In addition, bacteria, fungus or protozoa are listed as other possible sources of infections which can be transmitted from animals to human beings.

Like human life expectancy, animal life expectancy is also increasing, which is one reason the pet population is growing at the rate of about a million a year.

Among the dangers to children are animal bites, which means that both rabies and tetanus must be considered. Cat scratch disease has been known now for ten years. Psittacosis, a virus disease endemic in many kinds of birds, is another danger. Psittacosis in about 60% of reported cases in human beings has followed exposure to pet birds.

"Regarding allergies, little need be said beyond the fact that it is axiomatic that no child with allergic tendencies should have a pet with fur or feathers," the article states.

While no cases of encephalitic viruses have been reported, "it is conceivable that these infections may be transmitted to man and become a greater threat to children." Although rare, brucellosis, anthrax, and tularemia, can be transmitted to human beings by domestic pets.

Ear Cleaning

A report from Dr. Seymour Lustig, Englewood, New Jersey, reveals interesting

preliminary trials on a new technic for cleaning ears. Doctor Seymour says that he is working with a new cerumenolytic agent, Sebumsol (Parlam) which eliminates the need of deep swabbing, detergent lavage and suction in the majority of ear cases. This product is a component of normal sebum and is freely miscible with cerumen, as well as other oils, fats, and waxes of the skin. Primarily a solubilizing and cleansing agent, Sebumsol is not therapeutic unless the otitis is due to a simple accumulation of wax and dirt.

Based on approximately 50 cases, Doctor Seymour reports no evidence of toxicity except for one case which showed a slight irritation following treatment. While not a panacea for all types of irritation, the ability to thoroughly clean and debride the ear without resorting to additional insult and irritation is a valuable contribution.

A dropperful of Sebumsol is instilled in the ear one to three time daily. Following instillation, the ear canal is gently massaged to assure complete dispersion of the medication. Hard, deep-seated wax and fatty deposits are emulsified and float to the surface where they are easily removed by gentle wiping with a pledget of cotton. Usually three to four days of treatment are sufficient to completely clean the ear canal, after which appropriate antibiotic therapy may be used.

Panel discussions year in and year out continue to provide some of the most interesting meeting program fodder. The following question and answer discussions were abstracted from an excellent small animal panel at the Southern Veterinary Medical Association Meeting in Baltimore in November.

Patellar Involvement

How would you handle a case with patellar involvement in the nature of roughness and crepitation of surrounding tissue?

Dr. Jacques Jenny, University of Pennsylvania, advised surgical removal and cautioned that one should never try to close the gap produced except medial to lateral.

Removal of the Femoral Head

Has removal of the femoral head been tried in management of hip dysplasia?

Dr. Jacques Jenny, University of Pennsylvania, reported that to his knowledge this has not been tried, but after failure of a femoral head prosthesis, he has had some patients walk well without any femoral head. Soft tissue development seems to work rather well.

Electrocardiography

Dr. E. Edgar Ruebush, Washington D.C., answered the following series of questions on electrocardiography.

Is purchase of second hand equipment practical for veterinary electrocardiology?

In considering purchase of second hand equipment, do not get one of the old string galvanometer type. It is antiquated and requires development of photographic paper. The newer direct writing type is essential.

How can electrodes be attached practically in the animal patient?

Contact plates of the human type are not practical in long haired dogs. Bulldog clamps and special conductive paste or hypodermic needles inserted under the skin are the most practical procedures. Dogs seem to tolerate the use of hypodermic needles better than clamps.

CASE REPORT

Ketosis has received much attention in recent years, but still poses a disastrous problem when encountered on a herd basis. A number of new drugs have looked good in controlled trials, but clinical experience shows room for further improvement. This practitioner describes a clinical approach he finds to be reasonably successful.

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PROPHYLACTIC MEASURES IN BOVINE KETOSIS

IN NOVEMBER 1956, the owner of 42 milking Guernseys requested professional services for his herd. Since several of his cows had developed an acute illness, with decreased appetitie, rapid decrease in condition, and reduced milk flow, the owner, an excellent dairyman, was convinced that he was dealing with a contagious infection. However, examination revealed that all of the affected cows had ketosis. Considerable difficulty was experienced in convincing the owner that his herd was affected with ketosis and not a contagious infection but after he had accepted the diagnosis, he was eager to establish a program for prophylaxis that would prevent further trouble.

Umberger and Boley[1] had recently reported the results of a one-year study in which ketosis was practically eliminated from a dairy herd after the initiation of continuous therapy with an organic iodide, ethylenediamine dihydriodide (HI-Amine—Pitman-Moore) compound. The compound was added to the salt and grain feed and, in addition, each cow that freshened was given one tablespoonful of HI-Amine compound (0.5 gm. ethylenediamine dihydriodide) on the feed daily for 30 days, beginning on the day of parturition. A modification of this dosage schedule therefore was suggested to the owner of the Guernsey herd, and was accepted for trial. This is a report of the results which were achieved by following such a program in his herd for a two-year period.

Before the experimental prophylactic treatment with ethylenediamine dihydriodide had been started, a total of seven cows freshened within a period of a few weeks and all developed typical symptoms of ketosis. Four of these cows recovered promptly after a single treatment with 50% dextrose solution intravenously and prednisone (Meticorten—Schering) intramuscularly, but the other three cows had to be treated repeatedly. Of these three, one recovered completely after the third treatment, but the other two cows did not respond satisfactorily to routine therapy for ketosis, which was given on three occasions. In those cows which required more than one treatment, the dextrose and prednisone

therapy was repeated and, in addition, sodium propionate was given orally.

The entire herd was placed on organic iodide therapy by incorporating 1 lb. of HI-Amine compound (20 gm. ethylenediamine dihydriodide) with 50 lb. of loose salt, this mixture being made available free choice. In addition, cows which had developed ketosis during a previous lactation, and some of the other heavier lactating cows, were each given one tablespoonful of HI-Amine compound on the feed daily for one week before freshening and for four weeks after parturition. During the 1956-1957 lactation period, following this supplementation with HI-Amine, only two cows developed ketosis, which was mild in both cases, and they recovered without additional treatment.

After the initiation of therapy with ethylenediamine dihydriodide, one of the two cows which had failed to respond to repeated treatment with dextrose, prednisone and sodium propionate recovered slowly, and eventually was sold for beef. The symptoms in the other cow were very severe, and she showed no response to any treatment, including organic iodide therapy. After the owner dried her off she recovered eventually and was sold for beef.

Since the owner was well satisfied with the results of the treatment with HI-Amine, this therapy has been continued during the 1958-1959 lactation period. Again, only two cases of ketosis have occurred. One of these was in a cow which would not eat grain and therefore did not receive the extra HI-Amine compound during the pre- and post-partum period. The other cow developed ketosis 30 days after freshening, or two days after discontinuing the extra daily dosage of HI-Amine. Both cows responded satisfactorily to a single treatment with 50% dextrose intravenously and prednisone intramuscularly.

The year before treatment with HI-Amine was begun, one of the cows in the herd had had a very stubborn case of ketosis. After the initiation of HI-Amine therapy, she freshened twice and had no symptoms of ketosis either time.

The results of this study appear to substantiate those of Umberger and Boley,[1] who found in their one-year study that the incidence of ketosis fell from 46% to 8% with HI-Amine treatment.

Summary

A herd of 42 milking Guernseys with a high incidence of ketosis was placed on prophylactic therapy with ethylenediamine dihydriodide (HI-Amine—Pitman-Moore Company) compound. The dosage used was 1 lb. of the organic iodide compound to 50 lb. of loose salt, available free choice to all cows. In addition, 1 tablespoonful HI-Amine compound was given on the feed daily for one week before freshening and for four weks after freshening. During this two-year study only two cases of ketosis were observed each year. Two of the affected cows recovered without additional treatment, and the other two responded readily to a single treatment using routine measures.

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Debeaking Chickens

In a report dealing with debeaking of chickens to control cannibalism, the Maine Agricultural Experiment Station reports that it is better to wait until the chick is ten days old rather than immediately after hatching. Removal of more than one-third of the upper beak is contraindicated, since poor growth rate and feed conversion is likely to occur. Non-debeaked birds weigh more at marketing time although carcass grade may be inferior.

Effectiveness of Hygromycin B as an Ascaricide for Growing-Finishing Swine

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Controlled experiments reported here indicate that hygromycin, while eliminating A. suum *infections effectively, did not produce increases in rate of weight gain similar to those reported in previous studies.*

KELLEY *et al.*[1] reported in 1958 that hygromycin B effectively lowered parasitism with *Ascaris suum* and enhanced the growth rate of treated pigs. Since that time certain published reports have indicated that hygromycin exerts an appetite depressing effect on pigs above 100 lb. weight.[2,3] From time to time practicing veterinarians have reported instances where they thought the compound was not as efficacious as reported. The following study is a reinvestigation of the ascaricidal properties of hygromycin.

Crossbred gilts were placed in alfalfa pasture lots a few days before they farrowed. These pastures, one-third acre in area, were newly constructed in an alfalfa field that had not previously been occupied by pigs. Three gilts were placed in each pasture. They farrowed between May 8 and June 3, and remained with their progeny until the pigs were weaned. After weaning, 240 pigs were divided randomly into eight replications of treated and untreated lots. The pigs were lotted by weight groups so that each replication consisted of treated and untreated pigs of nearly the same weight. Thus, none of the heaviest pigs were placed in the same pen with the smallest pigs. The pigs were placed in the pastures which had previously been occupied by the sows and their progeny.

A 14% protein ration was fed from weaning time until the pigs were 112 days old. A 12% protein ration was fed thereafter. Hygromycin B* was added to these rations at the rate of 6,000 units per pound of feed and fed to the treated lots throughout the 92-day trial.

Worm eggs per gram of feces (EPG) were determined on almost all of the pigs four times during the trial. These counts were made on fecal specimens collected from the rectum of each pig. Counts were done routinely by Stoll direct centrifugation, but when no eggs were found by this method, Stoll flotation counts were made to concentrate the eggs.

When the pigs were slaughtered intestines from 19 untreated and 20 treated animals were examined for ascarids. Liver damage attributed to migrating Ascaris larvae was assayed by counting so-called "ascarid scars." Those livers having no scars were classed as 0; those with 1 to 5 scars as 1; those with 6 to 10 scars as 2; and those with over 10 scars as 3.

*Hygromycin was added as a premix, Hygromymix, Eli Lilly Company.

Egg counts. The effect of treatments on Ascaris infections is presented in table 1. Treatment reduced the number of infected pigs. Ascaris eggs were found in the feces from three of 107 of the treated pigs and in 91 of 104 untreated pigs. The egg per gram counts indicated that the intensity of infection was likewise lower in the treated pigs. The 91 infected pigs from the untreated lots had an average EPG of 1,215. The three infected pigs in the treated lots had an average of 2 EPG.

All 19 of the untreated pigs examined at necropsy were infected with *A. suum,* the average number of worms per pig being 24. Six of the 20 treated pigs were found to be infected at necropsy, averaging 3.66 worms each. Four of these infected pigs were injured animals that did not grow properly and were unfit for human consumption. Many of the worms found in both groups were immature.

Liver damage. Livers from 104 treated and 100 untreated pigs were examined; 19, 58, 18, and 9 livers from the treated pigs and 10, 59, 21, and 10 livers from the untreated pigs were classed 0, 1, 2, 3, respectively. Thus the treatment had no effect on the extent of liver damage.

There was no difference in the daily gain or feed efficiency of the treated and untreated pigs. Hygromycin did not depress the appetite of the pigs after they reached 100 lb. in weight.

Discussion

Hygromycin effectively eliminated *A. suum* infections in the pigs but its incorporation into the diet did not produce an increase in the rate of weight gain. The growth stimulating property of hygromycin noted in the authors' 1958 report[1] may have been lacking because of the general good health of the herd. Pigs in the present study were farrowed in late spring in individual houses with only three sows occupying one-third acre pastures. This management program apparently reduced the disease level in the herd. During the previous year, about 40% of the pigs in this herd were found to be infected with virus pneumonia.[4] The present pigs had a 13% incidence of infection with this disease. This system of management also seemed to lessen the effects of atrophic rhinitis which is enzootic in the herd. Examination of snouts of the pigs at slaughter indicated that the incidence of AR was about the same as had been observed in preceding years but in the present pigs there were no crooked snouts or sneezing such as had been seen in previous pig crops from this herd. Since there is some indication that part of the growth stimulation elicited by hygromycin may be due to its antibiotic action, the lowered disease level may partially account for the absence of increased gains in the treated pigs.

Untreated pigs (of the sample examined) harbored an average of 24 worms each. The range was 1 to 67. Although no necropsy examinations were done in the preceding test,[1] egg counts indicate that those pigs harbored more worms (EPG 10,860) than the pigs in the present trial (EPG 1,215). This lower level of parasitism may partially account for the lack of increased rate of gain in the treated pigs.

Hygromycin did not produce a depression of gains in the latter stages of the experiment, as has been reported by others.[2,3] We are unable to explain this disagreement unless it is connected in some way with the general well-being of the herd which, as

TABLE 1. Ascaris Infections in the Treated and Untreated Pigs as Indicated by Worm Eggs in Fecal Specimens

Age of pigs (days)	Untreated			Treated[a]		
	No. Sampled	No. Infected	EPG[b]	No. Sampled	No. Infected	EPG[b]
72	92	10	45	98	5	17
97	105	67	127	108	7	10
127	101	88	1264	104	15	7
148	104	91	1215	107	3	2

a. Received 6,000 units Hygromycin B per pound of feed from 56 days of age until 148 days.
b. Average EPG (eggs per gram of feces) of only the infected pigs.

TABLE 2. Gain and Feed Efficiency of Pigs During 92-Day Feeding Trial

	Untreated	Treated[a]
No. starting	120	120
No. completing	119	118
Av. initial wt, lb.	29.7	29.6
Av. wt, 49 days	97.3	96.7
Av. daily gain, 49 days	1.38	1.37
Av. final wt, lb.	183.7	182.9
Av. daily gain, last 43 days	2.02	2.04
Av. daily gain, entire period	1.67	1.66
Av. feed per lb. gain, lb.[b]	3.03	2.95

a. Received 6,000 units hygromycin B per pound of feed for the entire 92 days.
b. Corrected to a standard growth phase between 35 pounds to 200 pounds according to Lu, K. H. 1955. Adjustment procedures in feed conversion. Unpublished. University of Minnesota.

has been pointed out, was excellent.

The reduced efficacy of hygromycin in slow growing "runt" pigs has been pointed out to the writers on a few occasions by swine producers. Such anthelmintic failure may be due to lowered feed consumption and a correspondingly reduced drug intake by these unhealthy animals. For example, in the present trial nine pigs were judged unfit for human consumption because of their unhealthy condition. Five of these pigs were in the non-treated pens and four were in the treated lots. All had sustained leg injuries which resulted in swollen joints and lameness. All four of the treated runt pigs were infected with *A. suum*, harboring an average of four worms each. Pigs presented to veterinary clinics for diagnosis of disease frequently have been in poor health for some time and may harbor ascarids because they were unable to consume enough medicated feed to get an effective dose of the drug.

Summary

Hygromycin B was fed (6,000 units per pound of feed) to 120 pigs for 92 days post weaning.

The regimen effectively lowered parasitism with *A. suum* as indicated by fecal examinations. Ascaris eggs were present in the fecal samples from 87% of the untreated pigs and 2% of the treated pigs at the end of the trial.

Necropsy examination of 39 pigs substantiated the observations of the fecal samples. All 19 untreated pigs examined at necropsy harbored ascarids. Six of 20 treated pigs were found infected with *A. suum* upon necropsy. Four of these six were unhealthy animals and it is proposed that their parasitic infections remained because of an insufficient daily consumption of the anthelmintic due to anorexia resulting from other diseases.

No added weight gain resulted from feeding hygromycin, nor was there any depression of appetite in the heavier pigs.

Acknowledgments

The pigs in this study came from the Nebraska Experiment Station Swine breeding project at the North Platte Station which is being conducted in cooperation with the Regional Swine Breeding Laboratory, Ames, Iowa, Agricultural Research Service, USDA. This report has been published with the approval of the Director of the Nebraska Agricultural Experiment Station as paper no. 952.

The incidence of virus pneumonia and atrophic rhinitis was determined by N. Underdahl, Department Animal Pathology, University of Nebraska, when the pigs were slaughtered. The writers wish to thank him for this assistance.

The writers wish to thank Eli Lilly Company for their grant-in-aid to help conduct this study and for the generous provision of the anthelmintic Hygromycin.

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RECOGNITION

Man With a Mission

Dr. Francis W. Schofield

A few days ago I received a letter from Dr. Frank Schofield who retired two years ago from the faculty of the Ontario Veterinary College at Guelph.

A brilliant research man and teacher, hundreds of his students and fellow veterinarians also recall his sense of humor, his biting wit and, above all, an almost saint-like devotion to Christian principles and charity. It has been truthfully stated that during his lifetime he has given fully half of all his earnings to aid the sick, the oppressed and the underprivileged.

As a young man, Doctor Schofield spent a number of years in Korea where he witnessed and fought against squalor, hunger and sickness among the native poor. Now, in the twilight of his life, he has returned to this far Asian country to again dedicate his efforts to teaching and humanitarian activities. In his letter, Doctor Schofield states:

"I have just returned from a visit to the orphanage of Mrs. Euh. Pueen. It is amazing how this tiny woman with so frail a body manages an orphanage of 60 boys. Small quantities of rice come from the government; friends help with clothes and money; but for most of her supplies she depends on prayer to God and supplication to man. Her heroic and saintly spirit shines through the careworn and deeply furrowed face. Eighty-one years old and weighing only about 80 lb., this frail little woman, with the help of a stick, moves slowly from place to place among her big family. On Sunday they all go to church together where she has been teaching Sunday School for more than 50 years.

"There is a serious defect in the orphanage, as no land is attached to the buildings. There is overcrowding with no place for the children to either work or play. We must buy land and, fortunately, this can be done. There must be a vegetable garden in which older boys can work and a bit of land on which younger ones may play. We are also going to make a few rabbit hutches and pens for chickens.

"The piece of land, about one-quarter acre, will cost $500., and I have been able to make a deposit of $100. on it." So ends this part of his letter.

It looks to me that now is the time for all good veterinarians to come to the aid of Doctor Schofield, Mrs. Euh. Pueen and the 60 orphan boys in Korea. I'm sending my check today, and if you feel the same, why not send yours, % VETERINARY MEDICINE, 803 Livestock Exchange Building, Kansas City 2, Missouri, stating that it is a contribution to the Schofield fund.—*A. H. Quin, D.V.M.*

Special Report

THE ORGANIZATION MAN IN THE VETERINARY PROFESSION

INCREASING DEMAND FOR VETERINARY SPECIALISTS has created difficult new decisions for many young practitioners. Should I try one of the many positions in the feed or drug industry? This is a tougher decision for a young veterinarian than for the average college graduate. He has probably selected his profession with the thought of defending his right to a measure of independence. His training has prepared him primarily for a role of independent leadership in a community.

This question, unfamiliar to veterinarians a few years ago, becomes a vital issue today as young veterinarians are tempted with inviting positions. A young veterinarian considering a position in industry should look beyond the initial technical assignment before trading the headaches of practice for a career in industry. Few professionally trained men find long term satisfaction standing still and therefore must look at the problems of achieving top executive positions. Leadership opportunities taken for granted in private practice must be earned in industry. While a professional degree generally assures a good starting rung on the ladder, it cuts little ice in the business world when related to advancement toward top executive posts.

Young practitioners who are considering a career in business management should ask themselves ten basic questions.

To see how you rate as management material, give yourself ten points for each "yes" in the following quiz, five points for each "half-yes," and zero for each "no." Then, see the scoring table at the end.

The Organization Man

Do you like dealing with people? No quality is more important to an executive. The opinion others have of you is often a reflection of what you think about them; if you like them, they'll like you — and work for you! This doesn't mean that you must be friendly to the point where you fail to criticize poor efforts.

Do you really know your job? Doing your present job well is the only way you can advance to a better one, for past performance is what potential leaders are judged on. You'll do your job better if you know *why* you do it — just where you and your job fit into the total company picture. This will not only improve your morale but, by giving you a better grasp of the organization's set-up, prepare you for the next step up.

Do you look for better methods? Do

you try to dream up ideas? Do you understand and work at the important function of finding the most efficient way to get things done?

Do you seek responsibility? If you look around for something to do when your immediate job is fulfilled, if you stay with a job when others would let down, if you're willing to show someone else how to do something, you're the "responsible" kind who's likely to go places.

Have you heard that the way to get ahead is to keep information to yourself to "get the jump" on others? Forget it! Everyone respects brains, and management knows that someone who offers suggestions to help fellow employees is a good man for a key job. Because supervision — a prime executive task and talent — consists largely of teaching others, helping them to do their work better.

Are you willing to learn? The potential executive knows that he must literally *learn* to succeed — by taking courses, talking to superiors or more experienced co-workers, keeping up with the literature. But technical knowledge is not the whole story. The J. C. Penney Company management training program, for instance, emphasizes the development of lifelong "study habits" that have little to do with book lore. Learning all you can about the people your firm serves will help do a more effective job — and boost your managerial potential.

Do you accept criticism graciously? Taking criticism personally is not only a sign of immaturity — it's a sure way to cheat yourself of good will and valuable pointers. If you honestly think your critic is wrong, speak up and make counter-suggestions. But be sure you speak from knowledge and not from hurt pride—especially if it's the boss whose opinion you're challenging.

Can you express yourself well? Unless you can phrase your thoughts clearly and concisely, you're not adequately equipped to tell others what to do. Numerous personnel studies have shown that executives in every field tend to have above-average vocabularies. If you know you're weak here, or in the spelling or grammar department, correct these deficiencies before they hurt your chances.

Does time fly? If it seems to stand still, chances are your future is progressing at the same clip. There's nothing wrong with clock-watching so long as you can use the clock as a stimulus to work, not as an escape from it.

Are you an optimist? A good executive is optimistic and enthusiastic about his job and his company, and seeks to foster this constructive approach in his co-workers. Can you create good will for your company—both on and off the job? "Talk up" your firm when you're among friends, instead of joining the futile chorus of gripers.

Are you ahead of the competition? The best way to time your speed in the race for success is to keep a record of your performance. No matter what your job is, note how much you accomplished each week or each month. After a while, you'll find yourself automatically setting goals, concentrating on beating your most important competitor—the you of last year or last month.

Score Yourself

Are you 95 to 100? You have it. You are a "prime manager prospect." If you keep up the good (hard) work, you have an excellent likelihood of reaching the top. You are an extraordinary person.

Are you 85 to 90? You are definitely management material, but you'll be wise to step up your efforts if you want to live up to your potential.

Are you 75 to 80? You can make it, but you have a lot of competition. Scrutinize the questions on which you lost points, then ask yourself how you can improve.

Are you 65 to 70? The odds are against your landing a job in top management unless you can lick those traits that have cost you so many points.

Are you below 65? The organizational world probably isn't for you. If you have the gumption, success in industry is barely possible but be thankful for your professional training since you will probably be happier seeking a career in another of the many avenues open to veterinarians today.

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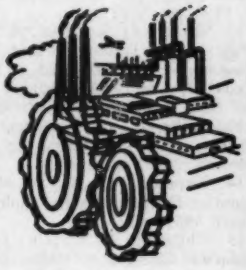

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Books reviewed in this department and any other books, if available, may be obtained by remitting published price to the publisher.

Practitioner's Bookshelf

FUNGAL DISEASES OF ANIMALS, by *G. C. Ainsworth, Ph.D., F.L.S.,* and *P. K. C. Austwick, B.Sc., F.L.S.;* 148 pages, illustrated. Commonwealth Bureau of Animal Health, Central Sales Branch, Farnham Royal, Nr. Slough, Bucks, England. Price—20 shillings.

Increasing knowledge of the role of fungi in the causation of many diseases of animals has indicated the need for a book in the English language on veterinary mycology.

Written by two mycologists who have had very close contact with veterinary problems in recent years, this book is intended primarily for teachers and students in veterinary schools but will also be of great value to practitioners who require an up-to-date and concise text. Research workers will find the extensive bibliography valuable.

DISEASES AND PARASITES OF POULTRY, (Fifth Edition), by *Edgar H. Barger, D.V.M., Leslie E. Card, Ph.D.,* and *B. S. Pomeroy, D.V.M., Ph.D.;* 408 pages, illustrated. Lea & Febiger, Washington Square, Philadelphia 6, Pennsylvania, Publisher, 1958. Price—$5.00

The chief aim of this book in its first four editions was to stress reduction in mortality among poultry flocks. To this end, the writers have presented a mass of accurate scientific information in a concise and easy to read style. Recent developments in poultry research have prompted thorough revision, hence this fifth edition.

This book itself can provide the client with a ready reference, but has not been developed as a veterinary treatise, although the practitioner would find it useful in poultry practice. Comprehensive references are appended to the various chapters.

MYCOSES OF MAN AND ANIMALS, by *R. Vanbreuseghem, M.D. and J. Wilkinson, Ph.D., F.L.S.;* 235 pages, illustrated. Charles C. Thomas, 301-327 East Lawrence Avenue, Springfield, Illinois, Publisher. Price—$10.50

Mycoses of Man and Animals is the English translation of the third part of the outstanding French work *Précis de Mycologie,* written by the late Dr. Maurice Langeron. This third part, devoted entirely to medical mycology, was added to the second edition by Professor R. Vanbreuseghem, friend and former pupil of Doctor Langeron, and it has proved an extremely valuable addition to the book. Now, Dr. J. Wilkinson has produced an English translation of the highest order.

This book presents a careful study of the mycoses, in alphabetical order, and the author has endeavored, within the 17 chapters, to include all that is essential, including recent work, concerning human and animal mycology.

The Cyanamid Foundation recently completed a controlled experiment to determine if the immune response to vaccination with CYVAC® Distemper Hepatitis vaccine was interfered with when antiserum was used simultaneously.

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MINORITY REPORT

The Best Answer is America

A copy of this book may be obtained by remitting $3.95 to the publisher, Vantage Press, Inc., 120 West 31st Street, New York 1, New York.

THE FRUITS OF A MAN'S WORK are never those which he expects — there is always some side effect which will seem after a while to be the principal one. In history a man wins a battle in order to obtain a crown or protect an oppressed people and the result — unexpected to himself — is a change of language over a wide district or the conquest of his own people by those whom he has befriended. Human events almost never move in a direct line, but obliquely, and with double-telescoping-flashbacks.

Thus when Dr. Alexander Sas-Jaworsky, a veterinarian, gave his history answers on $64,000 Question, a quiz program, he was cast into the spotlight of national publicity, not only because of his knowledge of American history, but also because he was an immigrant from his tormented homeland. The stage seemed perfect to tell his story in a book entitled *The Best Answer is America*. Then — unexpected to himself — the crash came. Quiz shows were discredited before a Congressional hearing, and the innocent along with the guilty were made to suffer. Honest contestants were refused the right to testify.

In the case of Doctor Sas-Jaworsky, the indictment of Quiz Shows will almost certainly spell doom to the sale of his book. In many ways this is something less than justice. For there are few in America who could not profit by reading and re-reading *The Best Answer is America*.

The book itself is not about Quiz Shows. It tells, rather, the story of a man with a capacity for humane outreach and deep compassion. It tells of the need about today — stark, desperate, yawning, colossal need — some of it the physical need for bread, and some of it the mental need for intellectual understanding, and some of it the spiritual need for human friendship and divine forgiveness, a need for man and for God.

In a series of flashbacks, the life story of this Ukrainian veterinarian, the son of a Catholic priest (Byzantine rite), tells a significant story. All the facts of Soviet and Nazi occupations are there, but it is not a brutal story. It is instead the story of a convert to Americanism in the same sense that there are converts to religions; and here, as with religions, the convert is a stronger American than those of us who have inherited that treasure.

In a day and age when we too frequently apologize for patriotism, when our fiction can give us characters no loftier than psychopaths or deviates, it is a pleasure to read such a biography.

I, for one, have no difficulty in believing that Doctor Sas-Jaworsky knew the Quiz Show answers for which he became famous. I do not consider myself a genius at history, and yet in front of my own TV set I was frequently able to answer four out of five. As a minority report, it might be well to tell the story of one who still insists in the honesty of his contribution to Quiz Show programs.—*Charles Walters Jr.*

Classified Advertisements

Twenty-five words or less, $3.50—minimum charge; additional words 10 cents each. Replies sent care VETERINARY MEDICINE 50 cents additional to cover forwarding postage. Remittance must accompany order.

Names of classified advertisers using V. M. key numbers can not be supplied. Address your inquiry to key number care VETERINARY MEDICINE, Suite 803, Livestock Exchange Building, Kansas City 2, Missouri, and it will be promptly forwarded to the advertiser.

Deadline for copy — 5th of month preceding date on issue.

For Sale

SMALL ANIMAL HOSPITAL: For sale, one of the most beautiful, modern, best located Small Animal Hospitals in Denver, Colorado area. Lucrative practice with facilities for expansion. Owner retiring. Address Box 632, care VETERINARY MEDICINE.

DOG BOOKLETS: 50 cents each. Feeding. Stud Dog. Handling Mating. Laws. Whelping. Shipping. Anatomy. Will Judy Publ'g Co., 2517 Michigan Avenue, Chicago 16.

FLORIDA PRACTICE: Practice on Florida's rapidly growing lower west coast; 90% small animal. Excellent location. Good facilities. Address Box 635, care VETERINARY MEDICINE.

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ASSISTANT: In a large and small animal practice in Wisconsin to lead to ownership. May purchase immediately if desired. Excellent location. Address Box 637, care VETERINARY MEDICINE.

SMALL ANIMAL VETERINARIAN: Licensed in Maryland, any age. Salary, commission basis or will sell practice and building. Excellent location. Address Box 633, care VETERINARY MEDICINE.

SURPLUS EQUIPMENT: Instruments required because I am starting practice from scratch. Write condition, price, etc. Address Box 634, care VETERINARY MEDICINE.

SMALL ANIMAL PRACTICE: In California. Wanted by experienced veterinarian on reasonable terms or to lease with option. Address Richard A. Shea, D.V.M., 1506 Vivian Lane, Newport Beach, California.

VETERINARIANS: Opportunities for employment are available with the Oregon State Department of Agriculture in the disease control and meat inspection assignments. Salary range for those with experience in practice—$525 to $600. For information and application form write to State Veterinarian, Oregon Department of Agriculture, Salem, Oregon.

Position Wanted

STUDENT: Junior Veterinary Medical student desires 1960 summer employment with predominantly small animal and/or equine practitioner. Intends employment to continue following graduation. Address Box 636, care of VETERINARY MEDICINE.

For Lease

SMALL ANIMAL HOSPITAL: New small animal hospital, equipped. Well established practice (10 years) in Denver, Colorado. $250 per month plus drug inventory. $1,000. deposit on lease. Address Box 638, care VETERINARY MEDICINE.

(DISEASES OF BABY PIGS) — *Concluded*

COLIBACILLOSIS

1. Baker, R. F., Some Complications Incidental to Swine Production. *Vet. Med.*, September 1956, p. 417.
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3. Hastings, C. C., Scours In Pigs, Questions and Replies, *N. Am. Vet.*, October 1951, p. 705.
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5. Kernkamp, H. C. H., Infectious Gastroenteritis and Colibacillosis in Pigs, Questions and Replies. *N. Am. Vet.*, May 1950, p. 336.
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9. Schmid, G., Different Forms of Swine Dysentery. *Jour. Am. Vet. Med. Assn.*, November 1952, pp. 391-393.
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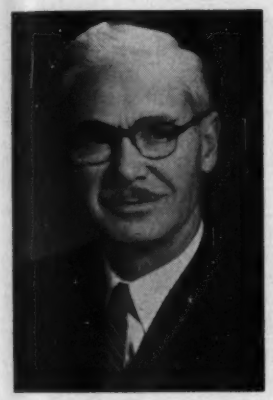
12. ....., A Liver Extract From Scouring Pigs. *Vet. Rec.* April 10, 1954. Abs. *Jour. Am. Vet. Med. Assn.*, September 1954, p. 248.
13. ....., Drug-Resistant *E. coli* Fecal Fauna In Pigs and Chickens. *Bio. Chemic Review*, Fall Qtr., 1957, pp. 8, 9, 26.
14. ....., Pig Diseases, *H. G. Messenger*, November-December 1953, p. 44.
15. ....., *Vet. Scope*, Vol. III, No. 1 Spring 1958, p. 14.

VETERINARY FIELDMAN

. . . wanted for Philadelphia Division of major dairy processor. Will act as liaison between company and suppliers. Must have interest in advancing into supervisory position and should have genuine interest in helping farmers with their problems. Prefer graduate since 1950 with at least 3 years' experience. Location in South Central Pennsylvania. Send full details of your education, experience and personal background to T-82, P.O. Box 2069, Philadelphia 3, Pa.

Booth Assumes A.A.H.A. Post

On January 1, 1960, the offices of the American Animal Hospital Association moved to Elkhart, Indiana. In keeping with the association's expanding programs Dr. Frank R. Booth has assumed the duties of executive secretary on a full time basis.



Dr. Frank R. Booth

Due to the rapidly increasing membership, requiring inspection before acceptance, in addition to the regular yearly inspection of all member hospitals, it has become necessary to enlarge the administrative staff.

The purpose of the A.A.H.A. is to advance the professional interest of veterinarians engaged in the hospitalization of small animals; to urge the provision of the best possible veterinary service through the medium of better hospital facilities; to foster maintenance of high standards in equipment and personnel, and to disseminate helpful information to all veterinarians on hospital construction, maintenance and methods, as well as care of the patient.

The association publishes a book, Planning Your Animal Hospital. Inquiries about membership, or questions related to hospital facilities and construction are welcome. Correspondence should be directed to Dr. Frank R. Booth, Executive Secretary, 3920 E. Jackson Boulevard, Elkhart, Indiana.

Since its foundation, the American Animal Hospital Association has been a moving force in sparking improvement of the standard of small animal medicine in the United States and Canada.

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D.V.M. to head our toxicology laboratory & dog breeding unit. Opportunity to do research.

Prefer member of American College of Veterinary Pathologists; however, non-member candidate with broad training & experience in histo-pathology will be considered.

Please send complete resume to Personnel Director

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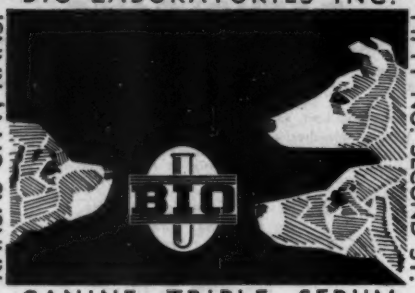

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Paton to Jen-Sal Post

Appointment of Dr. Iain Paton as director of professional services for Jensen-Salsbery Laboratories was recently announced.

In his new position, Doctor Paton will edit the two veterinary publications published by Jen-Sal and serve as chief veterinarian in providing technical counsel to the marketing department as well as to practicing veterinarians throughout the country.

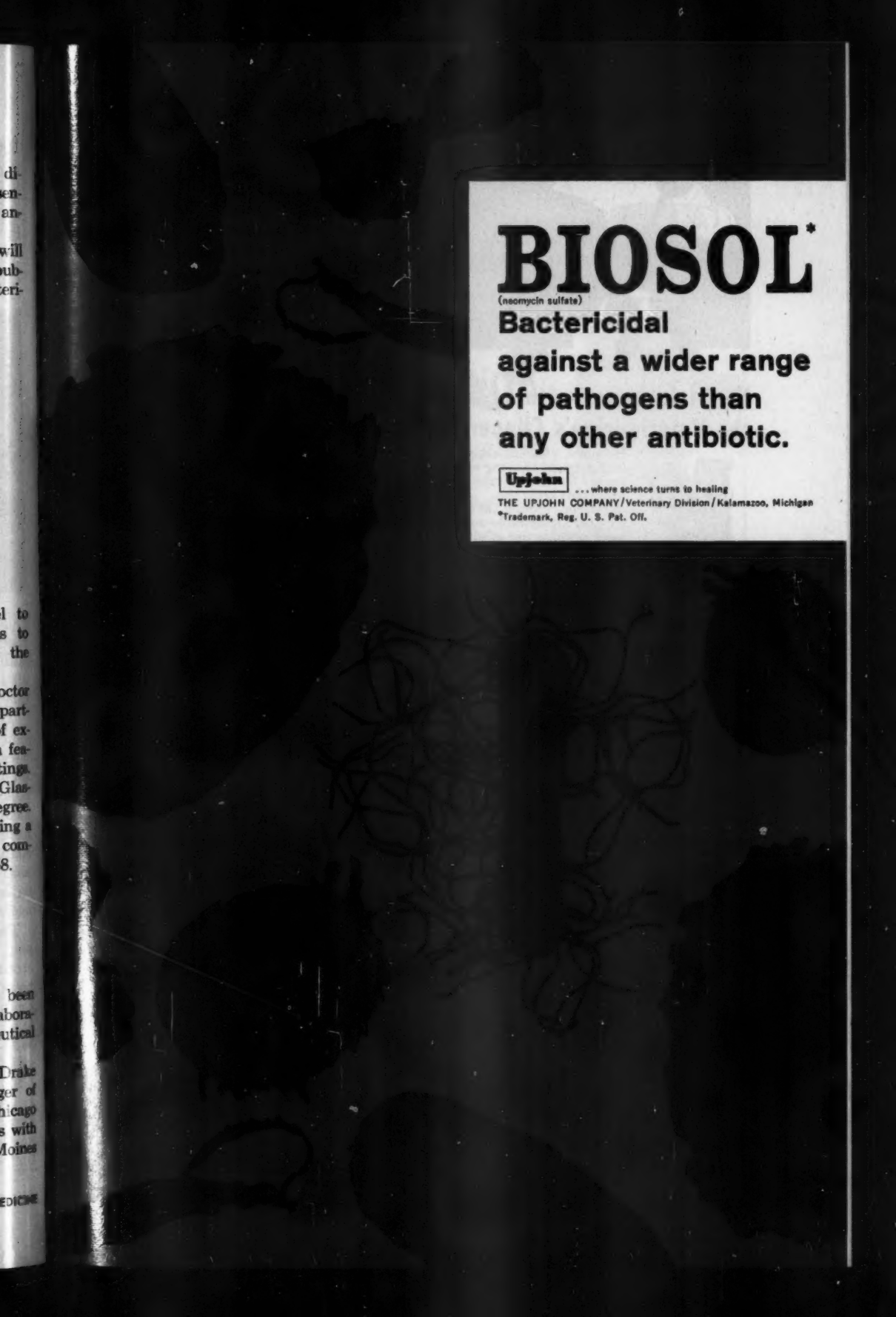
Dr. Iain Paton

For the past year and one-half, Doctor Paton has worked in the Research Department at Jensen-Salsbery in the field of experimental medicine and he has been a featured speaker at many veterinary meetings. He graduated from the University of Glasgow in 1948 with a M.R.C.V.S. degree. Doctor Paton spent ten years conducting a practice in Ayrshire, Scotland, before coming to the United States in April 1958.

To Head Diamond Accounting

William H. Weissenburger has been named comptroller for Diamond Laboratories, the biological and pharmaceutical firm.

Weissenburger is a graduate of Drake University. He was assistant manager of Hohmeier Mill and Lumber Co. in Chicago since 1956. Prior to that time he was with Green Colonial Furnance Co. in Des Moines as an industrial accountant.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Marshall Joins Corn States

Dr. Vincent Marshall has joined the staff of Corn States Laboratories as a virologist in biological development.

Doctor Marshall brings many years of research experience to Corn States Laboratories. As a research associate, he worked with Dr. J. A. Baker for four years in Virus and Bacteriology at Cornell's Research Institute. For 1½ years he was with the United States Agricultural Marketing Administration.

Stockton to Michigan Post

Dr. Jack J. Stockton has been named head of the Department of Microbiology and Public Health at the College of Veterinary Medicine, Michigan State University, East Lansing. A graduate of Ohio State University, Doctor Stockton served in the Veterinary Corps during World War II, attaining the rank of captain.

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Eisenbraun Joins Diamond

Dr. Allan A. Eisenbraun was appointed to the Department of Research for Diamond Laboratories recently. The firm produces veterinary biological and pharmaceutical products.

Dr. Allan A. Eisenbraun

Eisenbraun, 31, was born in Lodz, Poland, and graduated from the University of Innsbruck, Austria, and McGill University, Montreal, Quebec, Canada. Prior to joining Diamond, he was a research chemist.

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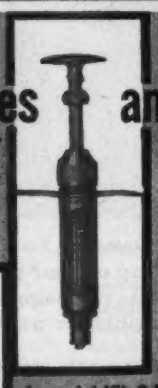

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Marketing Hearing Proposals

Amendment proposals to the Anti-Hog Cholera Serum and Hog Cholera Virus Marketing Orders were published in the Federal Register, December 3, by L. C. Heemstra, director, Animal Inspection and Quarantine Division, Agricultural Research Service. Culminating extensive hearings, these proposed amendments deal primarily with elimination of patronage dividends and refunds on purchases of hog cholera immunizing agents. Farmer cooperative associations would be allowed to continue patronage dividends.

Official publication of these proposals allows interested parties to file written exceptions before submission to the industry control group for approval.

To Head Schering Program

Dr. John S. Sickles has been appointed to the Veterinary Medicine Department of Schering Corporation. In his new position, Doctor Sickles will assist in Schering's veterinary clinical research program. He will be responsible for maintaining close contact with independent veterinarians studying new veterinary products.

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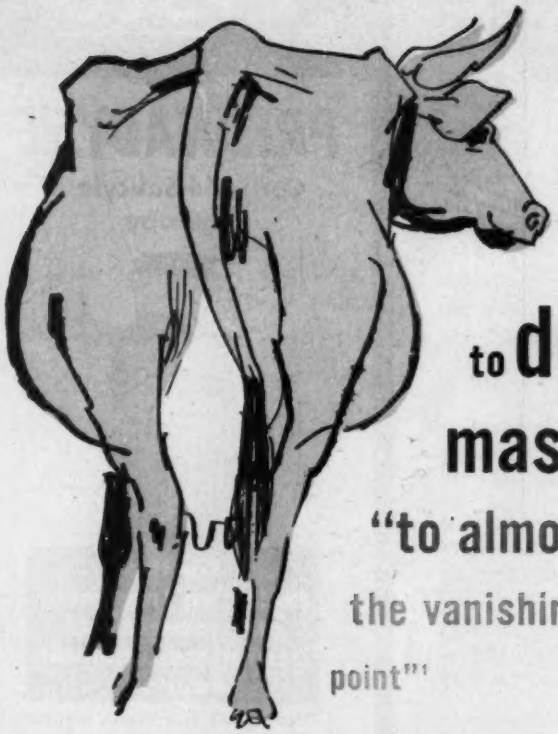

to decrease mastitis "to almost the vanishing point"[1]

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1. Kakavas, J. C., et al.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951.

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Heart Disease Research

A new era in heart disease research was launched at the University of Pennsylvania last month, when a $1,100,000 ten-year grant for research in the comparative diseases of the heart and blood vessels of animals and man became effective.

Dr. David K. Detweiler, associate professor of veterinary pharmacology, and chief of the Laboratory of Physiology and Pharmacology at the University of Pennsylvania School of Veterinary Medicine, will serve as director and principal investigator of the decade-long research effort, which will be supported by the largest research grant ever made to a School of Veterinary Medicine by the United States Public Health Service.

The financial support will be in the form of an original grant of $110,000 for 1960 from the National Heart Institute representing an expansion of that Institute's program in veterinary research, and will be accompanied by a commitment which will provide the same amount for nine additional years.

Doctor Detweiler will establish the University of Pennsylvania Comparative Cardiovascular Studies Unit (CCSU), which will serve as a research center for the study of the comparative aspects of the cardiovascular systems of animals representing as many species as possible. The unit will also carry out an international training program for research in comparative cardiology of the World Health Organization.

When the unit is in operation, research scientists from all over the world will come to the university for comparative cardiovascular research training. They will then return to their homelands to organize research centers modeled on the Pennsylvania unit.

According to Doctor Detweiler, "From our work with dogs, horses, cattle, and other domestic animals we know that animals suffer from cardiovascular diseases similar to those of man, and possess various unique physiological and anatomical adaptations and specializations of the cardiovascular system. For example, hypertension is a

concluded on page 106

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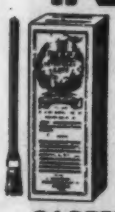

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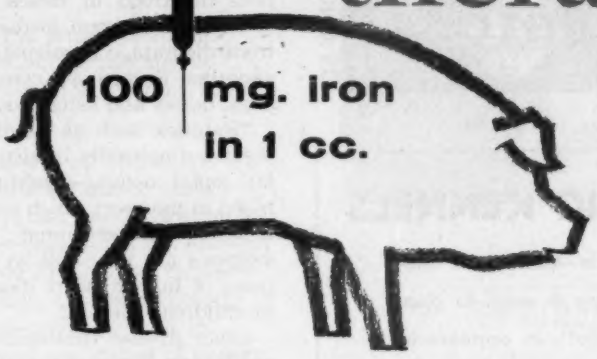

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naturally occurring phenomenon in turkeys and giraffes, and is related to the demand for higher levels of pressure to assure an adequate blood supply to the brain. Cardiac arrhythmias, or heart flutter, are common in horses and dogs, and have even been described in moles. Multiple heart sounds are common in the horse, and electrocardiographic peculiarities, thought to be abnormal in men, are considered normal in dogs, horses and kangaroos.

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Other disease conditions of man, which are known to occur spontaneously in animals include arteriosclerosis, atherosclerosis, chronic inflammation of the heart valves, myocarditis—inflammation of the heart muscle, myocardial degeneration, etc.

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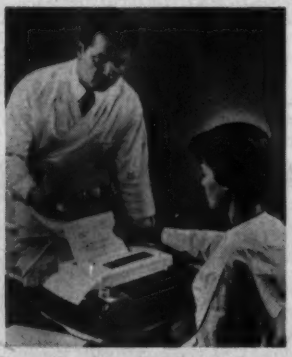
Air-San is a smooth, foot-operating receptacle with patented Magi-Close, which features a completely noiseless closing. An individual Ozium sanitizing spray dispenser is built into each unit. Unwanted odors are eliminated with push-button speed. Catalog sheets and price lists are available from Woodlets, Inc., 2048 Niagara Street, Buffalo 7, New York.

Royal Scot designates photocopy equipment that offers savings up to 50% over presently popular processes, according to the manufacturer. The Royal Scot copies originals up to 12 in. x 12 in. It makes any number of copies from one master. There is no guesswork for the operator since exposures are pre-set for best results from any original. For details check with Hunter Royal Scot, 566 Spencer Street, Syracuse 4, New York.



Hunter Royal Scot

Staphylococcus Toxoid designates a new tool for the veterinarian in his efforts to prevent mastitis through a comprehensive control program. Scheduled to be available early 1960, this product, when used in 5 cc. doses subcutaneously or intramuscularly, repeated in one month and annually thereafter, has been found to increase resistance to staphylococcal mastitis. For details, check with American Cyanamid, 30 Rockefeller Plaza, New York 20, New York.

Vet-Kem Dairy Cattle Dust effects rapid kill of insects that attack dairy cattle, according to the manufacturer. This material is easily dusted along the top and flanks of individual animals by using the punch-out top on the Vet-Kem Dairy Cattle Dust 1 lb. cans and 4 lb. cans. Pleasant odor properties of the product have been stressed. For details, check with Vet-Kem Laboratories, 12200 Denton Drive, Dallas 34, Texas.

An inexpensive **Ear Tag Holder,** useful in working blood testing problems, is now available to the profession. Directions for use of the ear tag holder are printed on the instrument, thus enabling the practitioner to use this item within minutes after first seeing it. The construction of the instrument is such that the low number on the string of tags is automatically the first one to slide past the "take off" button. The

price of the instrument is $1.00. Order directly from the manufacturer, R. J. Klaus, Box 98, Breda, Iowa.

The **Golfing Gizmo** brings a golf course to any practitioner with 40 feet of space in his yard or parkway. This item enables one to practice golf by driving a real golf ball

Golfing Gizmo

full power with woods or irons. Ball returns, indicates slice, straight, or hook. This sells for $4.95 postpaid. Write Golfing Gizmo, Box 4117, Cleveland 23, Ohio.

The new **Transistorized Progress Line** of two-way radio equipment of General Electric is described in Bulletin ECR 666, available from General Electric Communication Products Department, Lynchburg, Virginia. The publication describes how small size (8½ in. x 12 in. x 4 in.) units can be mounted in cars and other vehicles. Charts are included showing how the car's battery can be saved due to low power required by the new TPL unit which uses only 0.04 amperes on standby (with the engine off), ready to receive a call at full volume with less power than required by an automobile clock, which runs continuously.

A New Antibiotic Called Tylosin is effective against a number of Gram-positive bacteria and is relatively nontoxic, readily soluble, and relatively stable in solution. It is non-irritating when administered by injection or as a dust treatment. Palatability of feeds and drinking water is not affected by the addition of Tylosin. A product of Eli Lilly, it is now being further evaluated.

Kills

vegetative pathogens and spore formers within 5 minutes

the spores themselves within 3 hours

tubercle bacilli within 5 minutes

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This solution is specifically indicated for the practical and economical chemical disinfection of surgical 'sharps.' When used as directed, it will in no way impair keen cutting edges, points of hypodermic needles, scissors and other delicate instruments . . . an annual savings in instrument replacement and repair will far exceed the actual cost of the solution. If kept undiluted and free of foreign matter, it may be used repeatedly.

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Intravenous therapy for correction of calcium, magnesium and phosphorus deficiencies of cattle. Supplied in bottles of 500 cc.

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Red Udder Ointment

For relief of simple congestion in inflamed and caked udders. Also useful for mares, ewes and sows. Supplied in jars of 8 oz. and 1 lb.

TORUMEN

Torula Yeast Rumen Nutrient-Inoculant

Stimulant for rumen bacterial activity. Increases cellulose digestion 50 to 75 per cent. For treatment of simple atony of rumen, to stimulate appetite and rumen function, and to minimize feed lot bloat or other difficulties associated with changes in ration. Cartons of 1 lb. and 5 lb. Drums of 25 lb.

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